# DOCUMENT RESUME

ED 226 531 EC 151 009

| | |
|---|---|
| TITLE | Final Report: Kansas Research Institute for the Early Childhood Education of the Handicapped. |
| INSTITUTION | Kansas Univ., Lawrence. Kansas Center for Research in Early Childhood Education. |
| SPONS AGENCY | Special Education Programs (ED/OSERS), Washington, DC. |
| PUB DATE | 30 Jun 82 |
| GRANT | 300-77-0308 |
| NOTE | 553p. |
| PUB TYPE | Reports - Evaluative/Feasibility (142) -- Reports - Descriptive (141) |
| EDRS PRICE | MF02/PC23 Plus Postage. |
| DESCRIPTORS | Child Development; Demonstration Programs; *Disabilities; Early Childhood Education; *Exceptional Child Research; *Handicap Identification; *High Risk Persons; Infants; *Intervention; Student Evaluation; Young Children |
| IDENTIFIERS | Kansas Research Inst Early Child Educ Handicapped |

ABSTRACT

The document describes research completed by the Kansas Research Institute for the Early Childhood Education of the Handicapped. The institute was designed to help improve identification and intervention methods with children at-risk for handicapping conditions. Activities in four areas of research are described. The first area, developmental guides to intervention, contains research related to the analysis of infant receptive language development and to motor development in infants and severely handicapped preschoolers. Ecological guides to intervention focuses on the child's interactions with parents, peers, instructional materials, and teacher. Assessment guides to intervention, the third area, emphasizes learning assessments of child skills. The final research area, integrative research parameters, outlines procedures for data management and synthesis of results across individual investigations. The report goes on to detail dissemination activities, training, organization and personnel patterns, and the impact of the institute on researchers, practitioners, parents, policymakers, and students. (Author/CL)

***********************************************************************
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
***********************************************************************

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED226531

early childhood institute

# FINAL REPORT

June 30, 1982

EC 151 009

haworth hall ● the university of kansas ● lawrence, ks. 66045 ● phone: 913-864-5600

SCOPE OF INTEREST NOTICE
The ERIC Facility has assigned this document for processing to: EC

In our judgement, this document is also of interest to the clearinghouses noted to the right. Indexing should reflect their special points of view.

PS

# FINAL REPORT

Prepared by the
Kansas Research Institute
for the Early Childhood Education
of the Handicapped

University of Kansas

Submitted to
Special Education Programs
(Formerly Bureau of Education for the Handicapped)

June 30, 1982

* Preparation of this proposal was supported by OEO grant (USOE 300-77-0308) to the Departments of Human Development and Special Education, University of Kansas.

# TABLE OF CONTENTS

INTRODUCTION 1

CHAPTER I - DEVELOPMENTAL GUIDES TO INTERVENTION 15

QUESTION A: What are the Developmental and Environmental Correlates of Receptive Language Development in the First Year of Life? (Horowitz) 17

QUESTION B: Can the Specific Sequence of Sensory/Motor Development in Normal and Severely Handicapped Infants and Young Children Be Determined by Developing Measurement Procedures Sensitive to Small Increments in Sensory/Motor Acquisition? (Guess) 37

CHAPTER II - ECOLOGICAL GUIDES AND STRATEGIES FOR INTERVENTION 61

1) CHILD-FAMILY INTERACTIONS

QUESTION A: What are the Child-Family Setting and Social Processes Associated with the Etiology and Remediation of Family Dysfunction for Children At Risk for Developmental Delay? (Embry) 65

QUESTION B: What Strategies Do Mothers of Handicapped, At-Risk, and Normal Children Use to Teach Language? (Rogers-Warren) 81

2) CHILD-CHILD INTERACTIONS 115

QUESTION C: What Social Variables Affect the Social and Play Behaviors of Handicapped and Nonhandicapped Children in an Integrated Classroom? (Peterson) 115

QUESTION D: How Do Social Skills Develop in Handicapped Children? (Cooper) 185

3) CHILD-TEACHER INTERACTIONS 201

QUESTION E: What Are the Pattern and Content of Child-Teacher Interactions and How Can These Interactions Be Modified to Maximally Benefit the Handicapped Preschool Child? (Allen) 201

4) CHILD-SETTING INTERACTIONS 209

QUESTION F: How Can Transition from Therapeutic to Normal Classrooms be Faciliated? (Rowbury and Baer) 209

QUESTION G: How Can the Design and Utilization of Printed Academic Materials be Improved for the Education of the Young Handicapped Child? (Rowbury and Baer) 249

CHAPTER III - ASSESSMENT GUIDES TO INTERVENTION TECHNIQUES 273

QUESTION A: How Can a Discrimination Learning Model Be Used to Develop an Assessment-Guided Intervention? (Etzel) (Also see Appendix A) 273

QUESTION B: What is the Role of Instructional Variables in Identifying, Prescribing, and Implementing Optimal Teaching-Assessment Procedures? (LeBlanc) 277

CHAPTER IV - INTEGRATIVE RESEARCH PARAMETERS

QUESTION A: What Are the Relationships that Exist Among Variables within the Data-Base System? (Foster) 339

QUESTION B: What Are the Personal and Demographic Characteristics of Children and their Families Who Are Used as Subjects in Institute Research? (Foster) 352

CHAPTER V - DISSEMINATION ACTIVITIES 401

CHAPTER VI - TRAINING 461

CHAPTER VII - ORGANIZATION AND PERSONNEL 489

CHAPTER VIII - IMPACT OF THE INSTITUTE 499

REFERENCES 502

(APPENDIX A - SEPARATE VOLUME)

# FIGURES

Figure 1 - Dissemination Activities 5

Figure 2 - Progress Chart (Horowitz) 18

Figure 3 - An Atlas of the Neonatal Behavioral Assessment Scale K 21

Figure 4 - Progress Chart (Guess) 36

Figure 5 - The Handicapped Child's Environment 63

Figure 6 - Progress Chart (Embry) 66

Figure 7 - Experimental Analysis of Parent-Teacher Interactions 77

Figure 8 - Progress Chart (Rogers-Warren) 82

Figure 9 - Mother Elicits Verbal Behavior and Child Responsiveness 89

Figure 10 - Mother Elicits Non-verbal Behavior and Child Responsiveness 90

Figure 11 - Mother Feedback for Verbal Behavior and Child Responsiveness 91

Figure 12 - Mother Feedback for Non-verbal Behavior and Child Responsiveness 92

Figure 13 - Mother and Child Mean Length of Utterance 102

Figure 14 - Mother Elicits Verbal and Non-verbal Behavior and Child Responsiveness 104

Figure 15 - Distribution of Mother Cues and Child Responsiveness 105

Figure 16 - Distribution of Mother Forms and Child Responsiveness 106

Figure 17 - Distribution of Mother Complexities and Child Responsiveness 107

Figure 18 - Progress Chart (Peterson) 116

Figure 19 - Progress Chart (Cooper) 184

Figure 20 - The Effect of Increased Primes on Social Interactions 194

Figure 21 - Total Completed Social Interaction Intervals 195

Figure 22 - Effects of Increased Primes, Attention and Special Activity: Subject A 197

Figure 23 - Effects of Increased Primes Attention and Special Activity: Subject B 198

Figure 24 - Progress Chart (Rowbury/Baer) 210

Figure 25 - Individual Differences in Work Behaviors 213

Figure 26 - Work Behavior of Two Subjects Enrolled in Two Different Settings 214

Figure 27 - The Percentage of Time Referred and Nonreferred Children Engaged in Inappropriate Behavior 216

Figure 28 - The Large and Average Duration of Episodes of Inappropriate Behavior Exhibited by Referred and Nonreferred Children 217

Figure 29 - The Range and Average Number of Ways in Which Referred and Nonreferred Children Exhibited Inappropriate Behavior 218

Figure 30 - The Percentage of Time That Teachers Attended to Refereed and Nonreferred Children 219

Figure 31 - Teacher Attention Directed to Inappropriate Behavior and the Rate of Inappropriate Child Behavior 220

Figure 32 - Percentage of Disruptive Behavior and Participation Exhibited by the Three most Troublesome Children in Experiment I 224

Figure 33 - Percentage of Disruptive Behavior and Participation Exhibited by the Three most Troublesome Children in Experiment II 225

Figure 34 - Percentage of Disruptive Behavior and Participation Exhibited by the Three Most Troublesome Children in Experiment III 226

Figure 35 - Total Inappropriate Behavior in Group and Individual Format for Four Subjects 228

Figure 36 - Total Inappropriate Behavior in Group and Individual Format for Four Subjects 229

Figure 37 - The Effect of Training on Sight Word Acquisition - Kim 231

Figure 38 - The Effect of Training on Sight Word Acquisiton - Bert 232

Figure 39 - The Effect of Training on Letter Identification - Howard 233

Figure 40 - The Effect of Training on Letter Identification - Edith 234

Figure 41 - Average Number of Trials and Average Time on Story Reading - Kim and Howard 235

Figure 42 - Rate of Positive and Negative Interactions Exhibited by $C_1$ 238

Figure 43 - Rate of Positive and Negative Interactions Exhibited by $C_2$ 239

Figure 44 - Rate of Negative Interactions Exhibited by $P_1$ 240

Figure 45 - Rate of Negative Interactions Exhibited by $P_2$ 241

Figure 46 - Rate of Negative Interactions Exhibited by $P_3$ 242

Figure 47 - Rate of Negative Interactions Exhibited by $P_4$ 243

Figure 48 - Rate of Negative Interactions Exhibited by $P_5$ 244

Figure 49 - The Effects of Illustrations on Comprehension of All Parts of Speech in Storybook Prose for Six Children 251

Figure 50 - The Effects of Aural Variables on Comprehension of All Parts of Speech in Storybook Prose 254

Figure 51 - The Effects of Aural Variables on Comprehension of Depicted Parts of Speech in Storybook Prose 255

Figure 52 - The Effects of Aural Variables on Comprehension of Non-Depicted Parts of Speech in Storybook Prose 256

Figure 53 - The Effects of Aural Variables on Comprehension of Why-Questions in Storybook Prose 257

Figure 54 - The Effect of Storybooks on Children's Play in the Street 260

Figure 55 - Observed Children with High-Level Baseline Entries into the Street 262

Figure 56 - Observed Children with Low-Level Baseline Entries into the Street 264

Figure 57 - Progress Chart (Etzel) 272

Figure 58 - Progress Chart (LeBlanc) 278

Figure 59 - Responding Following Detailed and Minimal Instructions 280

Figure 60 - The Effects of Criterion-Related and Non-Criterion-Related Instructions on Simple Word Discriminations 282

Figure 61 - Comparison of the Effects of Criterion-Related Instructions Describing Only S+ with Those Describing S+ and S- 285

Figure 62 - Percent of Trials Responded to Within Four Seconds on Time Limited Discrimination Acquisition 287

Figure 63 - Percent of Trials Responded to Within Four Seconds on Time Limited Discrimination Acquisition 288

Figure 64 - Comparison of the Number of Subjects Reaching Pre Session Probe Criterion in Intermixed and Massed Training 295

Figure 65 - The Effects of Teacher Behavior Contingent on Subject Compliance or Inappropriate Behavior 299

Figure 66 - The Effects of Increased Praise, Paced Instructions and the Two Procedures Combined on Off-Task Behavior 302

Figure 67 - The Effects of Direct Training Plus Indirect Observational Learning on Integrating Two Relationships Into a Third 304

Figure 68 - Criterion Responding on Either Interspersed or Periodic Probes--Observed items 308

Figure 69 - The Effects of Direct Training and Observed Relationships on Acquisition of Equivalencies with Symbols 313

Figure 70 - The Effects of Direct Training and Observed Relationships on Acquisition of Equivalencies with Actual Pictures 314

Figure 71 - Timeline for Building Data Base Management System 320

Figure 72 - Subject ID Information Form 326

Figure 73 - Procedures for Project and Subject ID Assignments 327

Figure 74 - Distribution of Data Base Child Subjects Across Area Projects 329

Figure 75 - Progress Report (Foster) 340

Figure 76 - NBAS-K Form 348

Figure 77 - Child History Form 365

Figure 78 - Selected Trials from the Intensity Fading Program 394

Figure 79 - Selected Trials from the Stimulus Shaping Program 395

Figure 80 - Selected Trials from the Threshold Series 396

Figure 81 - Dissemination of ECI Working Papers 404

Figure 82 - Dissemination of ECI Observations Codes and Non-Technical Papers 406

Figure 83 - Total Dissemination Efforts 408

Figure 84 - Research Coordination Structure 490

Figure 85 - Management Structure 492

# LIST OF TABLES

Table Page

1 Summary of Studies (Guess) . . . . . . . . . . . . . 59

2 Community Interaction Checklist Data Analysis . . . 80

3 Summary of Mother-Child Code Categories . . . . . . 87

4 Mother Functions Within the Category of "Elicits Verbal" . . . . . . . . . . . . . . . . . . . . . . 93

5 Child Responsiveness . . . . . . . . . . . . . . . . 95

6 Child Functions: Overall Mean Frequencies . . . . . 96

7.1 Description of Subject Characteristics . . . . . . . 125

7.2 Free Play Areas Where Handicapped and Nonhandicapped Children Spent Their Time . . . . . . . . . . . . 126

7.3 Type of Play Exhibited by Handicapped and Nonhandicapped Children . . . . . . . . . . . . . . . . . 127

7.4 Types of Playmates Available in Freeplay Areas . . . 128

7.5A Playmate Selection by Handicapped Children . . . . 129

7.5B Playmate Selections by Nonhandicapped Children . . 130

7.6A Type of Play Exhibited by Handicapped Children . . 131

7.6B Type of Play Exhibited by Nonhandicapped Subjects . 132

7.7 Comparison of Play/No Play Behavior Within Integrated Classrooms . . . . . . . . . . . . . . . 138

7.8A Comparison of Type of Play in Freeplay Setting . . 139

7.8B F Ratios for Repeated Measure Analyscs of Variance on Type of Play Exhibited in Integrated Free Play Settings . . . . . . . . . . . . . . . . . . . 140

7.9A Comparison of Islate and Non Isolate Play . . . . . 141

7.9B F Ratios for Repeated Measures Analyses of Variance on Isolate/Nonisolate Behavior in Integrated Classrooms . . . . . . . . . . . . . . . 142

7.10 Comparison of Peer Interactions . . . . . . . . . . 143

Table Page

7.11A Comparison on Type of Interaction with Various Playmate Options . . . . . . . . . . . 144

7.11B F Ratios for Repeated Measures Analyses of Variance on Type of Social Interaction Exhibited . . . . . . . . . . . . . . . . . . 145

7.12 Characteristics of Handicapped Subjects in Integrated and Segregated Setting . . . . . . 149

7.13A Type of Play Exhibited by Segregated and Integrated Handicapped Preschoolers . . . . . 150

7.13B Type of Play Behavior . . . . . . . . . . . . . 151

7.13C F Ratios for Repeated Measures Analyses of Variance on Type of Play Exhibited by Segregated and Integrated Handicapped Preschoolers . . . . . . . . . . . . . . . . 151

7.14A Play Behavior of Handicapped Preschoolers in Segregated and Integrated Settings . . . . . . 152

7.14B F Ratios for Repeated Analyses of Variance on Isolate and Nonisolate Play by Segregated and Integrated Handicapped Preschoolers . . . 152

7.21 Playground Areas Where Subjects Spent Their Time . . . . . . . . . . . . . . . . . . . . 162

7.22 Types of Play Behavior by Subjects on the Playground . . . . . . . . . . . . . . . . . . 163

7.23 Playmate Types With Whom Subjects Interacted on Playground . . . . . . . . . . . . . . . 164

7.24 Comparison Between Handicapped and Nonhandicapped Subjects on Type of Playground Playmate Selected . . . . . . . . . . . . . . . . 165

7.25 Comparison of Playmate Selections When All Peer Options Were Available . . . . . . . . . 172

7.26 Comparison of Nonhandicapped and Handicapped Subjects' Playmate Selection in the Classroom . . . . . . . . . . . . . . . . . . . . 173

7.27 Comparison of Handicapped and Nonhandicapped Subjects' Playmate Selection on the Playground . . . . . . . . . . . . . . . . . . . . 174

8 Rate of Negative and Aggressive Interactions by $C_1$. . . . . . . . . . . . . . . . . . . . 246

9 Rate of Negative and Aggressive Interactions by $C_2$. . . . . . . . . . . . . . . . . . . . 247

Table

10 Rate of Negative and Aggressive Interactions by $C_3$. . . . . . . . . . . . . . . . . . . . . . . 248

11 Data Base Summary - May 1982 . . . . . . . . . . . . . . 328

12 Distribution of Computer Storage Blocks Across Area Projects. . . . . . . . . . . . . . . . . . . . . 330

13 Cross-Project Subject Summary - May 1982 . . . . . . . 332

14 Status Report: Early Childhood Institute Data Base Management System. . . . . . . . . . . . . . . . . . 333

15 Correlations Between Measures of Intelligence and Play Behavior. . . . . . . . . . . . . . . . . . . . . 342

16 Mean and Standard Deviations for Measures of Intelligence and Play Behavior . . . . . . . . . . . 343

17 Number of Subjects Shared with Each Project. . . . . . 346

18 Apgar Scores for Subjects with Data on Brazelton and at Least One Other DBMS Project. . . . . . . . . 347

19 Correlations Between Standardized Assessment Procedures . . . . . . . . . . . . . . . . . . . . . . 350

20 Number of Subjects with Standardized Assessment Data in Other ECI Projects. . . . . . . . . . . . . . . . 353

21 Mean Mental and Physical Development Indices for the Bayley Scales. . . . . . . . . . . . . . . . . . 356

22 Mean, CA, MA, and IQ for Subjects Within the Data Base and Within Each Project . . . . . . . . . . . . 357

23 Mean, CA, MA, and IQ for Subjects With at Least One, Two, and Three Tests . . . . . . . . . . . . . . . . 359

24 Mean, CA, MA, and IQ for 22 Subjects Who Were Administered the Stanford Binet Three Times. . . . . 360

25 Age, Sex, MA, Raw Score and MDI of Subjects to Whom the Bayley Scales Were Administered. . . . . . . . . 361

26 Subjects With Child History Data Base and Each Additional Data Base Project . . . . . . . . . . . . 364

27 Distribution of Birth Weights for 172 Subjects . . . . 387

Table

28 Length of Pregnancy for Mothers of Male and Female Babies . . . . . . . . . . . . . . . . . . . 388

29 Both Stanford Binet Scores and Mean IQ Scores for Sample With Child History Scores for Respondents' Perceptions of Environment During Pregnancy . . . 389

30 Parents' Perceptions of Children's Problems and Related IQ Data . . . . . . . . . . . . . . . . . . 391

31 Stanford Binet Scores for Subjects With Visual Acuity Results. . . . . . . . . . . . . . . . . . . 398

32A Dissemination During Year Five. . . . . . . . . . . . 409

32B Honors, Awards, Consultations During Year Five. . . 422

32C Planned Publications. . . . . . . . . . . . . . . . 425

33A Dissemination During Year Four. . . . . . . . . . . 427

33B Honors and Awards During Year Four. . . . . . . . . 441

33 Workshops and Consultations During Year Four. . . . 443

# Abstract

This document describes research completed by the Kansas Research Institute for the Early Childhood Education of the Handicapped. This research program was designed to contribute to the development and improvement of methods for identifying and intervening with children who are at-risk for handicapping conditions. The program has been based on the assumption that child skills and deficiencies cannot be described accurately when separated from the description of the child's larger environment. The proposed research has met the four primary goals established by the Bureau of the Education for the Handicapped (now Special Education Programs): 1) documentation of educational interventions, 2) description of the handicapped child's larger environment, 3) description of the handicapped child's characteristics, and 4) documentation of child progress.

Activities in four areas of research are described. The first area, Developmental Guides to Intervention, contains research related to the analysis of infant receptive language development and motor development in infants and severely handicapped preschoolers. The emphasis on the child's environment is reflected in the second chapter. Ecological Guides to Intervention. Investigations of the child's interactions with parents, other children in the preschool classroom, instructional materials, and teachers are described. Chapter III, Assessment Guides to Intervention, focuses on learning assessments of child skills. The final research chapter, Integrative Research Parameters, outlines procedures for data management and synthesis of results across individual investigations. Together the four research areas offer a thorough examination or critical child characteristics, environments, and intervention tactics.

In addition to research, the Kansas Early Childhood Institute has served two additional functions: 1) the training of new professionals in research methods related to the Early Childhood Education of the Handicapped and 2) dissemination of research findings to professionals and practitioners in education and related disciplines. Activities in these areas are described in Chapters V and VI.

Information about the administrative structure and personnel of the Institute are contained in Chapter VII. Finally, an assessment of the impact which the Institute has had as a result of its research, training, and dissemination activities is presented in Chapter VIII.

## INTRODUCTION

This report presents the accomplishments of the Kansas Research Institute for the Early Childhood Education of the Handicapped. During its five year history, the mission of the Institute has been to

> develop and improve methods of identifying and intervening with children who are at risk for handicapping conditions.

Herein are reflected the combined efforts of faculty and researchers from the University of Kansas Department of Human Development and Family Life and the Department of Special Education. Both departments have contributed expertise based on a long history of interest, service, and research activity in areas integral to the focus of the Institute.

In this section an overview of the conceptual basis and procedural plan are presented. This introduction is intended to define the problems and procedures of concern to the Early Childhood Institute and to provide a brief discussion of how the research projects were integrated. The first four chapters provide a rationale for each research section and describe the activities carried out. Dissemination and training are presented in Chapters V and VI. The remainder of the report contains a list of personnel associated with the Institute and a discussion of the impact of its research, training and dissemination activities.

### Conceptual Basis of the Institute

The research proposals described in this document are united by a common question: What child characteristics interacting with what environmental characteristics produce what developmental outcomes? The research model for the Institute is based on the premise that intervention strategies for handicapped children cannot be developed independently from ongoing assessment of both the children and the larger environmental settings in which they reside and are taught. The thrust of the Institute has centered on the analysis of the relationship among the assessed abilities and deficiencies of the child, intervention strategies, and environmental conditions that, directly and indirectly, affect the educational and treatment programs designed for the child. Although there are considerable complexities involved in the reciprocal analysis and evaluation of the child, the intervention program, and the environment, a more limited scope would not produce the quality and quantity of information needed to advance effectively early education efforts with young handicapped children. Thus, research has included a range of child and adult subjects, a variety of settings, and several types of intervention strategies, and focus on a constellation of behaviors critical to the young child.

### Overview of Research Methods

This section describes research concerns of the Early Childhood Institute including subjects, settings, measurement strategies, and integration and dissemination of findings. The research methodology reflects the Intitute's commitment to the applied analysis of behavior. Many of the studies are descriptive rather than intervention-based; however, all investigations shared an analytic approach to the development of child skills and environments.

Subjects. Nearly 700 young children, annually, have been directly involved in projects related to the Kansas Early Childhood Institute. About one-third of the children are handicapped or at-risk, and the entire group spans a range from 1 day old to six years of age.

Most of the studies involve samples of normal, handicapped, and at-risk children. Normal and more obviously handicapped children have been included as subjects to facilitate the development and improvement of procedures to identify at-risk children. Identification of handicapping conditions among infants and preschool children must necessarily include assessment of a wide spectrum of abilities and disabilities.

Early identification of handicapping conditions in children is difficult. There are many areas of development in which the behavior of children with mildly handicapping conditions resembles that of normal children. Observations of a more seriously handicapped child may indicate key areas of behavior that should be scrutinized in the early identification of less handicapped infants and children. Additionally, there are great similarities in the content of intervention efforts for both younger children with less handicapping conditions and children with more severe types of impairments (Sontag, Smith, & Sailor, 1977). Thus, the presence of normal and more severely handicapped infants and children in the research is highly desirable. The inclusion of divergent ages and abilities has permitted a more fine-grained analysis of the role of children's characteristics in development outcomes than would otherwise have been possible.

Settings. The importance of settings and setting events has been a primary tenet of ecological psychologists for some years (cf., Barker, 1968; Gump, 1977). Recently other psychologists, particularly behavior analysts, have begun to give greater consideration to settings and their effect on naturally occurring behavior and successful applications of the intervention strategies (Rogers-Warren, 1977). Individual children encounter considerable setting diversity. Children within a sample population may demonstrate considerable intra-subject variability in the settings to which they are exposed. Attention to setting diversity increases the chances of validity in representing children's capabilities or handicapping conditions. Particular attention has been given to the general setting (classroom, home, day care center, hospital) and specific setting events (size of group, instructions, instructional materials) in which measurements of child behavior occur. The careful documentation of setting variables will allow comparison of child behavior across setting variables. In some instances, setting events are a primary focus of investigation; in other cases, setting information is secondary, but useful.

Data Collection Procedures. The basis of scientific method is careful measurement and data collection. Investigators of the Kansas Institute share similar behavioral measurement strategies. Most of the studies have entailed systematic counting of the frequency of events, using reliable definitions of target behaviors. Reliability measures have been regularly computed and reported.

Data collection by different investigators are often relevant to research proposed by others in the Institute. Thus, common definitions and recording rules are used to insure comparability across related investigations. When it is not feasible to use the standard definition or recording procedure, specification of the definition employed and how it relates to the standard definition is included. For example, in some studies of cooperative play it is important to consider cooperative play as a series of component skills, each of which is measured independently: sharing, simultaneous use of a large piece of equipment, verbal interaction, and nonaggressive nonverbal interaction. In such studies, the general category of "cooperative play" does not occur; however, the four component categories correspond to the general definition of cooperative play used by other investigators. Because both definitions are on file with the data, it is possible to combine the subcategories of the first study for comparison with information obtained in other studies using the more general definitions. The use of common definitions and specification of exceptions facilitates comparison of children's behaviors longitudinally, and across settings, and tasks. The integration of data across subjects, setting and interventions is possible when repeated measures of related behaviors are obtained. Thus, comparability across definitions is is particularly useful.

Analyses of Data. Analyses of data occurred on two levels: within studies and across studies. Within studies, data were analyzed by graphic displays, statistical analyses appropriate to the study, or, occasionally, both methods. Specific methods of data analysis are included in each study. The fourth chapter of the proposal, Integrative Research Parameters, describes integration of data from individual studies. The use of a computer-based data-management system permits complex analyses of developmental trends, individual differences, and environmental covariants of --developments--outcomes which would not be possible on the basis of a single study.

Integration of Findings. Integration of findings has been carried out on three levels. First, an overall program of research has related investigations of critical behaviors, across children of different ages, in different settings. Second, the use of common data collection procedures and the use of an integrated data base allowed investigators access to relevant data from other projects in the Institute. Finally, Institute investigators met periodically to present, discuss, and review ongoing research. Research seminars have provided regular opportunities for investigators and staff to refocus their efforts toward cooperation and integration among individual programs of research.

Dissemination. The final phase of research is the dissemination of results to appropriate audiences. The Institute has carried out dissemination to professional audiences, to professionals who train practitioners, and to practitioners themselves. Comprehensive dissemination of Institute research results involved a planned effort, similar to the one involved in an integrated data base. A summary of the Institute's dissemination strategies is shown in Figure 1. A fuller discussion of the dissemination plan is located in Chapter V.

## Overview of Research Sections

The first portion of the research proposal has been divided into four chapters: (I) Developmental Guides for Intervention, (II) Ecological Guides for Intervention, (III) Assessment Guides for Intervention, and (IV) Integrative Research Parameters. Each of the four chapters reflects a common theme or investigative logic. Research in each chapter is united by experimental procedures, observational procedures, or by the genre of the research questions being asked. In several instances, individual studies share common elements with studies described in another chapter; this overlap is recognized and has been encouraged. Division of research into separate areas is a practical arrangement to facilitate description and evaluation of individual research projects. The activities of individual investigators have not been constrained by these divisions.

## Synopsis of Chapter I, Developmental Guides for Intervention

The notion of developmental trends has shaped both theory and practice in psychology and education. Consistent developmental trends have been observed for a spectrum of behaviors. The existence of a universal pattern in the emergence of certain human behaviors facilitates the identification of handicapped and at-risk children. The delayed emergence of a particular behavior class may signal other developmental delays. Once a child has been located on the continuum of development and an apparent delay noted, a sequence of behavioral objectives for intervention is readily available.

Developmental guides for intervention necessarily depend on a fine-grained analysis of devemopmental steps or relationships. Two major domains of development have been examined by Institute investigators: receptive language and motor development.

### Investigations of Antecedent and Consequent Events in Subsequent Development of Receptive Language Skills.

A review by Horowitz (1978) concludes that little research has documented the emergence of receptive language during the first year of life. Although linguists concur that the productive language children begin to display shortly after their first birthdays is certainly preceded by the development of receptive language skills, almost no systematic investiagtions of early receptive language have been reported. Description of typical and atypical infant receptive language development may be an important first step toward developing procedures for the early identification of less obvious handicapping conditions.

Horowitz and colleagues conducted research in three main areas relevant to the development of infant receptive language:

## DISSEMINATION ACTIVITIES

| | |
|---|---|
| FACE-TO-FACE INTERACTIONS | --CONFERENCES<br>--INSTITUTE CONFERENCES<br>--INSTITUTE WORKSHOPS<br>--TRAVELING SEMINARS<br>--SHARING INSTITUTES<br>--SITE VISITS<br>--COLLEGE COURSES |
| INFORMATION DISSEMINATION | --JOURNAL ARTICLES<br>--PRACTICAL PAPERS<br>--REVIEW PAPERS<br>--BOOKS<br>--BIBLIOGRAPHIES<br>--BOOK CHAPTERS<br>--NEEDS ASSESSMENT |

FIGURE 1

1) Language and communication in mother-infant interaction and the infant's larger environment.
2) Atypical phenomena in the infant's larger environment that are suspected to cause language delay.
3) Laboratory analyses of receptive language abilities.

Chapter I discusses the studies related to development of receptive language skills. It contains detailed descriptions of the studies, rationales, and research findings and conclusions.

## Assessment of Sensory/Motor Development Among Severely Handicapped and Nonhandicapped Infants and Young Children: Implications for Intervention Strategies.

Longitudinal, quantitative measures of motor and sensory/motor development among severely and multiply handicapped infants and young children are necessary for early intervention efforts. Haring (1976) noted that methods to assess "fine focus" behaviors are needed so that tiny lags in development can be treated immediately. Yet, there are few published reports of efforts to utilize precision measurement techniques with the motor and perceptual/motor development of severely and multiply handicapped children.

The research described in Chapter II on the assessment of motor development had as its long-term objective the design of a functional curriculum for severely handicapped children. The studies, directed toward the development of more precise "fine-focus" procedures for measuring basic sensory/motor skills, were a step toward that long-term objective. Additionally, the research provided for the measurement of specific intervention strategies. In brief, the research being done by Guess, Warren, and Rues involved three components:

1) The design and development of procedures for measuring (quantitatively) the sensory/motor growth of nonhandicapped and handicapped infants and children.
2) The comparison, via the measurement procedure, of the sensory/motor acquisition between handicapped and nonhandicapped infants and young children.
3) The evaluation of the effect of intervention procedures on handicapping conditions, through periodic assessment with the developed measurement system.

Details of the research studies carried out and conclusions drawn by Guess, Warren, and Rues, as well as details on the rationale for this research, can be found in Chapter I.

## Synopsis of Chapter II, Ecological Guides for Intervention

"Ecology" is a term shared by psychologists, sociologists, and educators (cf., Auerswald, 1969; Barker, 1963, 1968; Michaels, 1974; Wahler, 1972), yet there is little agreement concerning its precise definition (Holman, 1977). Ecology, in this proposal, refers to the interaction between a child and the surrounding physical and social environments. Of particular interest are all the therapeutic and home environments of the handicapped or at-risk child. It is assumed that the child's interaction with the social and physical milieu is demonstrated in the child's behavior. That is, differing social and physical environments will result in varied behavior by the same child.

The behavior of persons in the child's environment and the child's response to these persons comprise a social system that might also be considered ecological in nature (Wahler, Berland, Coe, & Leske, 1977). The child functions within social systems of the family, classroom peers, and the teaching or caretaking staff in the intervention setting. These groupings overlay the physical setting and modify its effects. The child may be in the same physical setting, yet produce quite different behaviors due to the immediate social milieu. Thus, the child in the special education classroom behaves quite differently in the presence of three peers, than in the presence of a single teacher.

Many environmental variables may have an impact upon the capacity of a particular treatment setting to provide optimal intervention services for handicapped children and their families. Through a better understanding of how critical variables within treatment environments affect the ultimate prognosis for the child, environments may be more effectively designed to meet the needs of the child. Ecological evaluations of physical and social variables in the environments of handicapped and at-risk children are needed to provide (a) further definition of environmental conditions that may signal increased effects of handicapping conditions, (b) identification of variables that may impede the remediation of those conditions, (c) information about the effectiveness of intervention environments, and (d) information about structuring optimal therapeutic environments and programs.

The tactics for ecological research with this population must necessarily be twofold. First, the relevant ecological variables must be identified for the population and the setting at hand. Only after such identification can experimental interventions be made to arrange optimal learning or living conditions.

The research reported in Chapter II has been divided into four areas: (1) Child-Family Interactions, (2) Child-Child Interactions, (3) Child-Teacher Interactions, and (4) Child-Setting Interactions.

## 1) CHILD-FAMILY INTERACTIONS

### Characteristic Interactions of Families with Normal, At-Risk, and Handicapped Children

A number of investigators have explored the behavioral characteristics of parent-child interactions in families with handicapped children (cf., Bradley & Caldwell, 1977; Richmond, 1976; Rondal & Turnure, 1976; Shere & Kastenbaum, 1966). These data indicate that families with a handicapped or an at-risk child have lower scores on maternal involvement, availability and presentation of age appropriate toys, and appear to use somewhat more punitive methods in child management. This information, paired with other results indicating that 70% of the parents of very young handicapped children report severe child-management behavior problems (Tizard & Grad, 1961), suggests that the interactions between parents and their handicapped children have negative effects on both the children's and the family's functioning.

One hypothesis about dysfunctioning families is that when children are not initially responsive to their parents, parents respond by reducing their involvement, which in turn results in the children engaging in maladaptive, more adversive methods of attention-seeking behavior (e.g., whining). The parent may respond more punitively in an attempt to reduce these behaviors, may find the child even less appealing, and then reduce positive contact with the child still further. This hypothesis is directly supported by experimental analyses of interventions with dysfunctioning families (Patterson, Cobb, & Ray, 1973; Wahler, 1969). However, this hypothesis had not been established through longitudinal or intervention based evaluations of family relationships and processes when Embry undertook an ecobehavioral analysis of family interactions. Her research has involved mothers and their handicapped or at-risk children who were originally studied by Horowitz and colleagues during the first year of life.

### Language Teaching Strategies by Mothers of Normal, Handicapped, and At-Risk Children

Language, a pivotal behavior in the classroom and home, must be understood and used productively in order for the child to manage the environment. Accordingly, language is often a target for intervention by teachers. However, the handicapped preschooler will spend more time, especially as a toddler, in the family environment and is expected to learn basic receptive and productive language from persons in the home.

For the handicapped or at-risk child, the language teaching that occurs in mother-child interactions is particularly critical. The handicapped child may have physical or cognitive deficits that interfere with the normal processing of language stimuli in the natural milieu of conversation and daily events. Specific linguistic interaction guided toward eliciting language from the child or teaching a particular linguistic concept may be necessary for the acquisition of most language skills. Research has documented the implicit use of teaching strategies by mothers interacting with their normal children, (e.g., Moerk, 1977), however, very little is known about the language teaching by mothers of handicapped children.

The research by Rogers-Warren has investigated the parameters of mother-child interaction that relate to mothers' teaching of language and linguistic concepts to their handicapped children. The research is closely related to work by Moerk (1977) and is intended to extend his analysis of mother-child teaching interactions to both longitudinal and cross-sectional samples of normal, at-risk, and handicapped children, from the ages of one year to 42 months.

Details of the research accomplished and proposed by Rogers-Warren and Embry can be found in Chapter II.

## 2) CHILD-CHILD INTERACTIONS

### Patterns of Play Interactions Among Handicapped and Nonhandicapped Children

The mainstreaming movement has primarily focused on school-aged children. However, its influence has also extended to preschool programs serving handicapped children. A major premise underlying the mainstreaming model is that handicapped preschool children will profit from exposure to nonhandicapped children. Many projected benefits of integrated and mainstreamed programs have been described (e.g., Guralnick, 1976, 1978; Snyder, Appolloni, & Cooke, 1977; Bricker, 1978; Peterson & Haralick, 1977). To date, arguments about the benefits of the model have not been well substantiated by empirical proof. While the potential benefits of preschool mainstreaming cannot be overlooked, there has been no clear demonstration of the superiority of integrated programs over segregated programs (Wynne, Ulfelder, & Dakof, 1975). Much of the limited literature on preschool mainstreaming thus far has been "evaluative" rather than "experimental" in nature. Conclusions have been based on a few subjects and usually presented in a case study format. A considerable amount of research is still needed in order to understand the social dynamics that occur within preschool integrated and mainstreamed settings.

Peterson has been conducting a two-level inquiry into the issues related to mainstreaming handicapped preschoolers:

1) To gather descriptive and normative data on social interaction patterns among handicapped and nonhandicapped children across several preschool environments; and
2) To evaluate the effects of various environmentally and teacher-based arrangements on the social interaction of handicapped and nonhandicapped children.

### Acquisition of Social Interaction Skills by Normal, At-Risk, and Handicapped Children

Normal children's social interaction with peers has been observed to increase both qualitatively and quantitatively, between the ages of two and five years. Some authors note general stages of social development at fairly specific ages (cf., Todd & Heffernan, 1964).

In general, developmental sequences of play for normal children appear to be fairly consistently defined. However, it has not been known if the same sequences of development describe the developmentally delayed or handicapped child nor whether the social interaction sequence varies according to handicapping condition. The pattern of social skill development is important because cooperation appears to be vital for social and academic adjustment in school. Cooper has tracked the development of cooperative play skills in typical and atypical preschoolers and has designed intervention strategies according to children's specific needs. Cooper's longitudinal assessment of child-child interactions, coupled with Peterson's cross-setting analysis, provide a better understanding of social interaction in normal and handicapped children. Both Peterson's and Cooper's research are described further in Chapter II.

## 3) CHILD-TEACHER INTERACTIONS

### A Facilitative Teaching Strategy

Observations of teachers in the preschool has suggested that many teachers take limited advantage of the opportunities for teaching during free play periods. Children, in a free play situation, are often in a highly motivated state and tend to make frequent contact with teachers during this time, asking for materials, information, help, recognition, and attention. Teachers may fail to recognize the teaching opportunity implicit in these child initiations and (a) fail to respond, (b) respond noncommittally, (c) respond in a closed-end fashion so that nothing more is required of the child, (d) respond didactically (in the less favorable sense of the word), (e) do for the child, thus reinforcing helplessness and dependency in the child, of (f) bombard the child with a superfluity of verbage or assistance. Any of these events is likely to terminate child responding at that moment and possibly decrease child-to-teacher initiations.

Normally developing children usually learn a basic repertoire in spite of these kinds of teacher responses. For handicapped children such teacher responding can have deleterious effects. Often, one of the few highly teachable moments available to the teacher on a given day for that child may be lost. Thus, with the amount of time assigned to free play, teachers must capitalize on such incidental teaching opportunities. Accordingly, Allen developed and evaluated a specific set of empirically determined teacher and child initiations and response patterns to be organized into a facilitative teaching model. The facilitative teaching model derived from several sources: (a) the classroom communicative interaction play described by Rieke (1974), (b) the milieu teaching model proposed by Hart and Rogers-Warren (1978), and (c) the Hart and Risley (1975) incidental teaching model. The main departure of the facilitative teaching model from the incidental teaching model is that the effect of the teacher as initiator-to-child as well as responder-to-child is being examined. Allen's research is discussed in Chapter II.

## 4) CHILD-SETTING INTERACTIONS

### Transition from Therapeutic to Traditional Classrooms

Rowbury and Baer studied one macro-setting interaction: transition to normal classrooms from therapeutic classrooms. Often therapeutic classrooms are structured without consideration of the child's future participation in other educational settings (Plummer, 1976), and children have difficulty making the transition. Much critical learning time may be lost while the child adjusts to new schedules, learns to ask for help in large-group situations, and adapts to a smaller amount of individual attention. Thus, it may be necessary to prepare at-risk children, both conceptually and environmentally, if they are to be successful in their transitions from one intervention setting to the next intervention setting. The research by Rowbury and Baer had examined ecologies of preschool and public school classrooms for children with various handicapping conditions and has evaluated the performance of children from special classrooms as they make the transition into normal preschools and public schools. As critical differences were identified, a series of experimental analyses of ecobehavioral variables were performed to determine how smooth transitions could be accomplished.

### Instructional Materials and Workbook Formats

Rowbury, Baer, and D. Embry studied one class of micro-setting events: printed academic materials in the form of workbooks, worksheets, and storybooks.

Teachers generally rely on workbooks and worksheets as a medium of instructions, practice, confirmation, and artful elaboration and extension of skills previously targeted with instruction and demonstration. Workbooks and worksheets vary greatly in specific formats. Teachers often seem to assume that children, even handicapped children, can easily master format differences and attend to the critical conceptual lesson embodied in the workbooks' pages. But, in fact, it is likely that the workbook format is itself a conceptual lesson (Campion & Brown, 1973) and may well represent one not yet mastered; especially by handicapped children. Rowbury and Baer's research was designed to remediate this problem affecting young handicapped or at-risk children.

Storybooks are extensively and effectively used for a number of purposes in preschools, nursery schools, and special classrooms including: (a) the facilitation of prose comprehension, and (b) the teaching of appropriate social behaviors and/or new language behaviors, and inhibiting inappropriate behaviors through symbolic modeling (cf., Guttman, Levin, & Pressley, 1977; Whitehurst, 1977; Wildgen & Sherman, 1976; Zebrowitz-McArthur & Eisen, 1976). In general, these findings had not been extended to handicapped children (except Wildgen & Sherman, 1976), classroom settings, or longer stories more typical of storybooks. Further secondary effects on teacher behavior and other child behaviors were not known. Their wide usage, teacher and parent acceptance, children's delight in them, and preliminary research indicating their instructional effectiveness for a spectrum of behaviors. Rowbury, Baer, and D. Embry describe their studies of storybooks in Chapter II.

## Synopsis of Chapter III, Assessment-Guided Interventions

This research is partially the result of questioning by educators and psychologists (e.g., Bijou, 1976) of the utility of traditional psychological assessment instruments. In addition, many professionals (Wolfensberger, 1965) have noted that the diagnosis of learning problems and prescriptive instruction are seldom made by the same instruments or people, and in many instances the prescriptive side may not be attempted. Thus dissatisfaction with assessment (diagnostic) instruments, and a paucity of research on prescriptive instruction provided the impetus for the research of this section.

Assessment should indicate not only the levels of skill and cognitive development an individual has attained, but it should also tell the professional how to plan for instruction for the individual in the future. With this latter information generally lacking in current assessment, the teacher is seldom aided by the testing process. As Wolfensberger (1965) has noted, many children are diagnosed but seldom is the diagnosis interpreted into recommendations regarding teaching strategies.

Two investigators in the Institute have approached the deficits in traditional assessments from different but complementary perspectives. Both concentrated on assessment occurring during a learning situation because, they agreed, future learning could be better predicted from current learning than from the presence or absence of a skill at a given time. They differed in approach: Etzel investigated how a child's response to a discrimination learning task could be used to develop an assessment-guided intervention system. LeBlanc, from a different perspective, used preschool children's responses to various instructional strategies as the basis for learning assessment. Both investigators here emphasized procedures and formats that can be used individually or in small groups by preschool teachers.

The results of both approaches to assessment during learning have been used to build prescriptive intervention procedures. The type and pattern of children's errors to learning or instructional situations were used as the basis for prescribing specific intervention procedures. Again, the emphasis has been on materials and procedures useful by preschool teachers in small group settings.

LeBlanc and Etzel present their research, findings and conclusions in Chapter III.

## Synopsis of Chapter IV, Integrative Research Parameters

The research and other activities described in this chapter were designed to provide continuity across investigators to insure a programmatic research thrust in meeting the Institute goals. Four major activities comprised this effort:

1) Building a Data-Base Management System. This system has permitted the integration of data across research studies. Data was combined and manipulated as necessary across subjects, settings, and research variables.

2) Establishing a Data Collection Team. This team has obtained information on child and family characteristics for children who served as subjects within research studies of the Institute. This information includes data, demographic variables and traditional test data. The primary use of these data is the accurate discription of the subject population and the relating of these variables to other subjects investigated by the Institute researchers.

3) Design a Research Monitoring System. This system has provided a communication network to promote integration of research. It includes procedures for monitoring ongoing studies and conveying results of research by one investigator to another investigator conducting a related project.

4) Conducting Research Relevant to Integrative Research Parameters. The data-base management system established a source of information for use in nonmanipulative research. Data obtained in other research efforts has been analyzed for relationships across studies. The content of this research spans the variables investigated within the Institute.

The above activities have facilitated communication within the Institute and extended the programmatic nature of the research conducted. The Integrative Research Parameters team has acted as a clearinghouse for information to all researchers within the Institute.

## Affiliated Research Programs

Although the programmatic research proposed by the Institute is of considerable scope, it does not encompass all facets of child characteristics, child behavior, child environments, or possible intervention strategies. A number of independently funded research grants have been invited to contribute to the research focus of the Institute. These grants generally have represented analyses of aspects of child behavior and environments complementary to Institute research. In some instances, affiliated grants were conducting research paralleling the efforts of the Institute but directed to a wider range of populations or specific behaviors. An effort has been made to integrate the findings of affiliated research grants with those of the Institute and to share relevant data and procedural information.

## Summary and Conclusions

The research described briefly above (and in great detail in the following chapters) has resulted in a conceptual framework for identifying handicapped children, describing the environmental settings in which they are found and designing and validating interventions that alleviate the effects of those handicapping conditions. The benefit of any single line of research could not be fully realized without its having been within the programmatic context formulated by the Institute investigators. Identification of handicapped children with no attention to the environments where they function would have limited utility. Additionally, interventions designed without extensive information about children's characteristics or their environments would have limited use. Therefore, the investigators associated with the Kansas Early Childhood Institute have designed and carried out a comprehensive research plan for assessing the child, the family, and the environment extensively, and then building interventions based on that information. While much of this research has been conducted under Kansas Institute funding, it is anticipated that this research will also serve as a solid foundation on which later research will be based. The programmatic plan has extended throughout the Institute and into other research efforts of the investigators. Many of these related efforts are described under affiliated grants.

This synthesis of research across investigators has culminated in a systematic approach to identifying children who are at-risk for a variety of reasons and intervening with them from a prescriptive basis, depending upon their specific behavioral or environmental characteristics.

# CHAPTER I DEVELOPMENTAL GUIDES TO INTERVENTION

## Introduction

The description of normal child development has received a great deal of attention during the last 50 years (e.g., Bayley, 1933; Cattell, 1940; Frankenburg & Dodds, 1969; Gesell, Thompson, & Armatruda, 1934). This emphasis on describing child development has led to a considerable body of literature describing the application of procedures for the identification of the at-risk child. A few of the scales which have resulted are the Neonatal Behavioral Assessment Scale (Brazelton, 1973), the Denver Developmental Screening Test (Frankenburg & Dodds, 1969), the Learning Accomplishment Profile (Sanford, 1975), Developmental Pinpoints (Cohen, Gross, & Haring, 1976), and the Portage Project Checklist (Shearer, Billingsley, Frohman, Hilliard, Johnson, & Shearer, 1974).

Early measures of children's intellectual, perceptual, and psycholinguistic abilities have not been found to bear a strong empirical relationship to the children's performance level in the later years (Evans & Nelson, 1977; Ysseldyke, 1973). Although early measures of child development are correlated to later measures, the relationship is tenuous, and prediction on an individual basis is not warranted. Consequently, it is almost impossible to make decisions concerning the necessity of an early intervention program with a given child unless that child scores at one of the extreme ends of the distribution of scores on that test. Typically, for these established-risk children, decisions concerning the need for intervention can be made without assessment devices, although not necessarily about the type of intervention program needed.

One difficulty in determining if a very young child is at-risk for a handicapping condition and selecting an appropriate intervention strategy, has been that instruments for tracking normal development could not produce a sufficiently fine-grained analysis to discriminate between children of slightly varying abilities. Traditional assessment devices have been limited in distinguishing small differences among individuals because of the validity, stability, and reliability of the instruments (Hammill & Larsen, 1974; Hammill & Wiederholt, 1973; Sedlack & Weener, 1973); such instruments were designed to measure the range of development. They emphasize the description of entire populations ranging from individuals with few skills to those with abundant skills, resulting in an instrument which does not make fine distinctions. The at-risk child and the normal child may be within a few points of each other on such scales, and the standard error of measurement is typically larger than the differences between these children. Although it is theoretically possible to have a test comprehensive enough to cover the full range of abilities and precise enough to make fine distinctions at this level, this kind of test does not currently exist. Furthermore, it is unlikely to be developed because it would necessitate an extremely large test, much of which would be irrelevant for any given child.

Because traditional assessment procedures have limited usefulness in the identification of at-risk children, a different, more detailed analsis of developmental sequences was needed for this population. Two such analyses are presented in this section.

This section, Development Guides to intervention, approached

Goal 1.1: Evaluating the effectiveness of existing assessment devices and developing new methods for early identification of children within a broad range of handicapping conditions

from two perspectives. The first program of research was designed to evaluate the receptive language abilities of neonates, to describe the infants' auditory environment and its effects, and to work out a developmentally-based assessment strategy for detecting handicapping conditions relevant to language learning at a much earlier age than has been possible.

The second research project has evaluated sensory/motor skills in typical and atypical children to determine the developmental sequence to be used to develop an environmentally-based curriculum for teaching motor skills to severely handicapped children. These measurement procedures were applied to other populations to determine their feasibility for identifying at-risk children.

Both research efforts have analyzed child development to determine if sequences of skills emerge that can be used for identifying potential problems in a child's development. Each project approaches a specific area of development (receptive language or sensory/motor development) with the goal of performing detailed analysis of the skills, which when present, contribute to normal child development, and when absent or incompletely developed, represent a critical developmental deficit. The projects are designed to determine if the developmental sequence of skills is systematically different in order, as well as in timing, for severely handicapped children. The current effort concentrates on determining the sequence of skills, and methods for assessing them, although there is a strong concern for relating developmental sequences and identification procedures to intervention strategies.

To augment the programmatic nature of these research efforts, data obtained from the programmatic investigations of both investigators are included in the Data Base Management System. (A systematic effort has been made to relate these data across projects.) Additionally, normal, at-risk, and severely handicapped infants have been followed on a longitudinal basis. Additional traditional assessments and prescriptive assessments developed by other Institute investigators have been administered to these children. In this way, relationships among the various assessment devices have been ascertained. Further discussion of the integration of these data can be found in Section V, Integrative Research Parameters.

## DEVELOPMENTAL GUIDES TO INTERVENTION

## QUESTION A: WHAT ARE THE DEVELOPMENTAL AND ENVIRONMENTAL CORRELATES OF RECEPTIVE LANGUAGE DEVELOPMENT IN THE FIRST YEAR OF LIFE? (PI: Horowitz)

Almost a year of life passes before productive language emerges in the human infant. The sudden spurt (of identifiable words) from an infant is a source of joy to parents, and a source of puzzlement to psychologists and psycholinguists. While it is often assumed that receptive language is acquired before productive language, present understanding of the processes involved in receptive language development during the first year of life is minimal.

When the Institute began five years ago, an analysis of available literature (Horowitz, 1978) and a discussion of various theoretical approaches led to the conclusion that data then available were not particularly helpful in providing either empirical evidence for receptive language development during the first year of life or in offering useful theoretical directions. However, existing studies did suggest some prescriptions for future research on receptive language development in infants, which, in turn, affect strategies for the identification of and intervention for young handicapped and at-risk children:

1. The behavioral repertoire, and associated individual differences, of neonates and very young infants should be reliably identified; such data might subsequently form the basis for early identification (in infancy) of children whose individual characteristics, in combination with their rearing environments, indicate that they are risks for abnormal development.

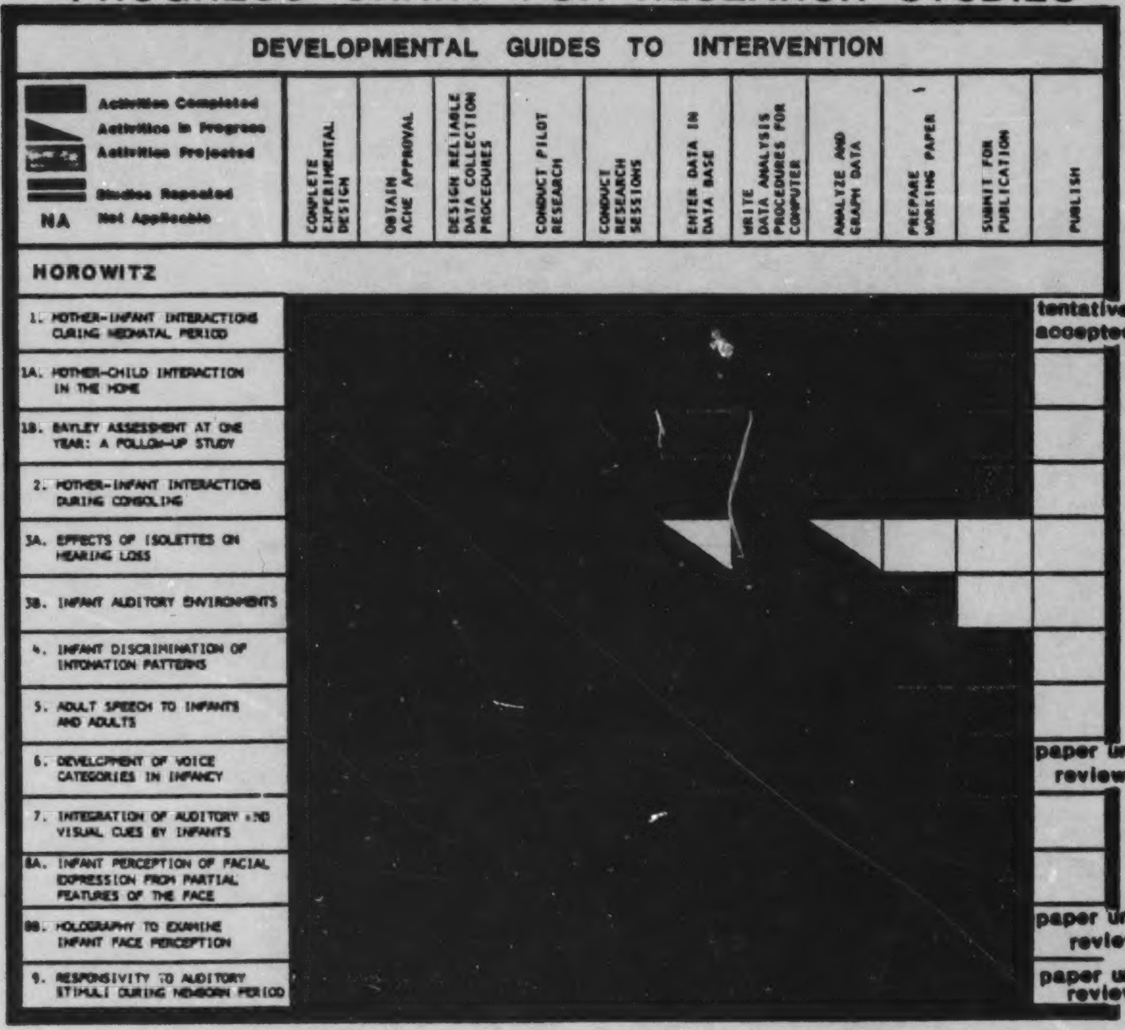
2. The communication (verbal and nonverbal) between infants and their caretakers needs to be reliably mapped so that the significant environmental events interacting with infant characteristics and developmental outcomes will be better understood, which may ultimately lead to more powerful intervention with developmentally delayed infants.

3. The nature of auditory experiences of infants in the first year of life requires documentation so that potentially significant setting events interacting with infant characteristics and developmental outcomes will be better understood, which may also yield more potent intervention strategies.

4. Longitudinal studies on relatively common, critical health-related episodes experienced by infants that are thought to affect hearing and subsequent language development should be conducted, since new treatment protocols might be designed subsequently that might reduce the incidence of language delay.

5. Finally, studies are required that further document the emergence of receptive language abilities of infants in the first year of life. Information from such studies would be likely to lead not

# PROGRESS CHART FOR RESEARCH STUDIES



## DEVELOPMENTAL GUIDES TO INTERVENTION

■ Activities Completed
◢ Activities in Progress
▨ Activities Projected
☰ Studies Repeated
NA Not Applicable

**HOROWITZ**

| | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. MOTHER-INFANT INTERACTIONS DURING NEONATAL PERIOD | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | tentatively accepted |
| 1A. MOTHER-CHILD INTERACTION IN THE HOME | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 1B. BAYLEY ASSESSMENT AT ONE YEAR: A FOLLOW-UP STUDY | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 2. MOTHER-INFANT INTERACTIONS DURING CONSOLING | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 3A. EFFECTS OF ISOLETTES ON HEARING LOSS | ■ | ■ | ■ | ■ | ■ | ◢ | ■ | ◢ | | | |
| 3B. INFANT AUDITORY ENVIRONMENTS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | |
| 4. INFANT DISCRIMINATION OF INTONATION PATTERNS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 5. ADULT SPEECH TO INFANTS AND ADULTS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 6. DEVELOPMENT OF VOICE CATEGORIES IN INFANCY | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | paper under review |
| 7. INTEGRATION OF AUDITORY AND VISUAL CUES BY INFANTS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 8A. INFANT PERCEPTION OF FACIAL EXPRESSION FROM PARTIAL FEATURES OF THE FACE | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| 8B. HOLOGRAPHY TO EXAMINE INFANT FACE PERCEPTION | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | paper under review |
| 9. RESPONSIVITY TO AUDITORY STIMULI DURING NEWBORN PERIOD | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | paper under review |

FIGURE 2

only to the development of a diagnostic assessment tool for identifying infants showing delayed receptive language acquisition but also to the identification of more salient intervention strategies.

These prescriptions for research on receptive language development coincide with the programmatic research thrusts of the Early Childhood Institute and affiliated grants. Studies on development of receptive language in the first year of life are discussed below.

## PART I: INFANTS AND ENVIRONMENTS

Researchers at the University of Kansas, under the direction of Frances Degen Horowitz, have been in the forefront of the development of the Neonatal Behavioral Assessment Scale (Brazelton, 1973). The Scale (also known as the "Brazelton") provides a rich descriptive array of a neonate's behavior and abilities, which vary greatly by infant. While the Neonatal Behavioral Assessment Scale (NBAS) proved that newborn infants were far more competent than was widely believed, it has not been as successful as a screening device for infants who might be at-risk for abnormal development. One reason for this failing may be that the scoring procedure in the original instrument focused only on the child's *best* response and not the child's most typical response; thus, the original scoring technique may have suppressed information that may have been relevant to screening at-risk children; further, the technique did compress the variability in scores. Recent efforts by Horowitz and colleagues have focused on improving the NBAS.

The current research has had as a general goal the early identification of risk infants in the "normal" population and in the obvious high-risk nursery population. The assessments of infant characteristics and environmental stimulation patterns were pursued because it had been hypothesized that it would be possible to identify infants at risk for abnormal development only when we could specify what infant characteristics under what environmental conditions result in an interaction that produces non-optimal developmental outcomes. The research involved the administrations of the revised Brazelton to most infants born at Lawrence Memorial Hospital in Lawrence, Kansas, and to those born at the University of Kansas Medical Center in Kansas City, Kansas, as well as a follow-up of a sample (N=100) of infants during the first year of life.

From a sample of over 1300 normal newborn infants, we have collected data on performance on the Neonatal Behavioral Assessment Scale with Kansas Supplements (NBAS-K). These data are providing the basis for compilation of an "Atlas" that will report the normative information against which risk samples may be evaluated, individual "outlyer" infants may be identified and population samples compared. (The development of the NBAS-K and the initial data collection was supported by a grant from the NICHD. ECI resources were used to expand from the originally planned sample of 500 to the over 1300 that now constitute the data bank on normal infant behavioral performance on the NBAS-K.)

This Atlas will present the results of analysis of NBAS-K performance of a sample of more than 1300 normal infants. The report will include chapters on the results of analyses by items, information on the differential discriminability and stability of items, different approaches to compositing the results of the scale (such as factor analysis, cluster approaches, etc.). It will also give a full report of the relationship of NBAS-K scores to background variables such as maternal SES, type of delivery, medication and maternal age and race. Finally, selected analyses related to internal test characteristics will be presented. The table of contents for the Atlas is presented in Figure 3.

## STUDY 1: MOTHER-INFANT INTERACTIONS DURING NEONATAL PERIOD
(PIs: Horowitz and Linn)

In order to enhance predictability from the infancy period to later childhood, some assessment of early infant environments may be necessary, in addition to infant individual difference measures. This study attempts to describe an early neonatal environment, including nursery and rooming-in settings, of a group of normal, healthy infants.

*Subjects/Settings/Observation Procedures*. Twenty-eight lower-class, black infants (male, female, firstborn, laterborn) were observed for five 30-minute sessions, including two feeding times with the mother and three between-feeding observations in the newborn nursery at the University of Kansas Medical Center. An extensive observation code was utilized via Datamyte computer-compatible data collection devices. In addition, the Neonatal Behavioral Assessment Scale with Kansas revisions (NBAS-K) was administered on the infants' second and third day by trained testers. (A second, smaller sample of lower-class infants is currently being tested and observed using the same procedures, in order to replicate the findings in this group.) A middle-class sample of 28 infants has also been tested and observed with these procedures to provide comparisons with another socioeconomic environment. Data analysis is still in progress.

*Results and Discussion*.

*Lower-class sample*. Previous analysis of these data had specified many relationships between the *durations* of mother-infant interaction variables coded during the postpartum feeding observations and the infant's individual NBAS-K *item scores*. These data indicated that infants who were alert and responsive to the NBAS-K stimuli, and required the tester's help in controlling their level of arousal, displayed very similar behaviors when interacting with their mothers. These findings provide both a cross-setting validation of the behaviors assessed in the NBAS-K tests and a confirmation of the hypothesized reciprocal nature of early interactions.

TENTATIVE TITLE: AN ATLAS OF THE NEONATAL BEHAVIORAL ASSESSMENT SCALE - K

## Chapters

Horowitz I. Introduction

Sullivan II. The Sample

Byrne III. Procedures
    Collection
    Storage
    Analysis

Sullivan IV. Analyses by Items
    a. Test Items Scored for all Infants
        5-15, 17-24, 26, 28-32
        nominative distribution
    b. Test Items Scored for Subsample
        Habit, Consol, Self Quieting, Modal Smiles
    c. Patterns of Missing Data

Byrne V. Differential Discriminability and Stability of Items
    Discriminability Potential of Each Item
    Matrix of Variability x Discriminability
    Effects of Sample Size on Stability of Item Means
    Identifying Outlyers
        a. Difference Score - very low vs. very high
        b. Reinforcement Value
        c. Egeland's Non-Optional Score
        Do their test profiles look noticeably different from rest of the sample?

Horowitz VI. Different Approaches to Composites
    a. Factor Analysis - Principle Components
        Variance and Rotation Effect of Recording
    b. Clustering
        1. Lester's 7 Clusters
        2. Kansas Clusters
        3. A Priori
            3 and 5
    c. Stability of Composite Scores

Horowitz VII. Relationship of Background Variables with Composite Scores
    a. Maternal Variables
        1. Mother's Age, Race and Education
        2. Length of Labor, Gravida, Para, Type Delivery, Number of Abortions
    b. Baby Variables
        1. Sex
        2. Apgars 1' & 5'
        3. Birth Weight, Current Weight, Weight Loss, Ponderal Index and Head Circum.
    c. Test Variables
        1. Day of Test
        2. Test Duration
        3. Tester (10 Testers c̄ $\geq$ 50 Tests)
    d. Medication

Sullivan VIII. Relationship of Habituation, Consolability, Self-Quieting, and Smiles with the Composite Scores - Effects of Missing Data

Horowitz
Byrne &
Sullivan IX. Issues Related to Choosing Data Analysis Strategies and Interpretations of Data
    Reliability
    Sample Size
    What is the Research Question
    Single vs. Repeated examinations

Figure 3

In order to investigate these relationships further, two new statistical techniques have been implemented and applied to these data. A new technique for summarizing the newborn test data, developed by Lester and his colleagues in Boston, involves clustering the large number of Brazelton scores into a much smaller number of variables. Each of the 28 infant's NBAS-K profiles have been reduced to eight "cluster scores," and these scores are currently being correlated with the durations of behaviors coded during the observed feeding sessions. This parsimonious approach to the large number of scores produced by the NBAS-K assessment may help to simplify and clarify the many variable interrelationships revealed in the initial correlational analysis.

Another new statistical technique has been applied to the timed, sequential observation data. The computer programs which calculate the conditional probability statistics were revised to direct a plotter to generate graphs that clearly contrast the mother's contingent responsiveness to her infant with the simple probability of her behavior (that is, the tendency for her behavior to occur by chance in the interactive sequence). The newborn and 1-month data are currently being summarized by this graphing technique; data collection on the preterm group is nearly complete and will also be summarized by this technique. The completion of these procedures will allow clear comparisons of caregiver responsiveness across the lower-class, middle class, and Neonatal ICU environments.

Replication of the lower-class sample and addition of a middle class sample. In order to replicate the findings in the lower-class, newborn data, a second, smaller sample of lower-class mothers and their infants was collected, and the data is being analyzed. Two NBAS assessments and naturalistic observations of two postpartum feeding interactions were conducted for each of 15 mother-infant pairs; analysis of the data and comparison of the findings with the larger, lower-class sample is planned.

Collection of a middle-class comparison sample has been completed. Twenty-seven infants have been tested with the NBAS-K on Days 2 and 3, and observed (with the Datamyte observation code) during two postpartum feeding interactions. Data analysis is currently being carried out.

## STUDY 1a: MOTHER-CHILD INTERACTION IN THE HOME
(PIs: Horowitz and Linn)

When the infants in the lower-class sample reached 2 weeks of age, they were tested with the NBAS-K in their homes. At 1 month of age, another NBAS-K examination was completed, and an 8-hour observation of the infants in their home environments was conducted. Only 20 of the original sample of 28 infants could be contacted for the 1-month follow-up, due primarily to the unusually high mobility of this population.

Results and Discussion. In a finding similar to the newborn results, the modal, or more typical behavior of the infants assessed during the 1-month test were more related to the observed interactional behavior of the infant and caregiver than were the best scores.

In a replication of the newborn findings, significant correlations were found between the infants' alert responsiveness and orienting on the NBAS-K test, and the infants' and caregivers' behavior in the home observation sessions. Specifically, at 1 month, mothers tended to cuddle their infants and regard them en face when their infants showed lower orientation scores. Infants with higher modal orientation scores were held farther from the mothers' body during their interactions.

In another replication of the newborn findings, mothers classified as responsive at 1 month, based on the conditional probability of their contingent response to an infant "signal," tended to have infants who showed much variability in their repeated NBAS-K tests.

Analyses of these data are being continued, using the NBAS-K data summary and graphics techniques described earlier (see Study 1). These techinques will aid comparison of the newborn and 1-month testing and observational data. The smaller, lower-class replication sample and the middle-class comparison sample were tested at 2 weeks and tested and observed at 1 month; this data is still being analyzed. Data on the middle-class comparison sample was also collected at 6 months and is being analyzed. These data will allow us to ask whether patterns of infant-environment relationships observed in the newborn period at 1 month (and at 6 months?) are particular to one socioeconomic group or are generalizable across social class. Portions of these data appear in "Newborn Environments and Mother Interactions", a dissertation accepted for publication in a forthcoming volume of Infant Behavior and Development.

## STUDY 2: MOTHER-INFANT INTERACTIONS DURING CONSOLING
(PIs: Horowitz and Leake)

This correlative study seeks to determine whether specific patterns of infant consoling are associated with particular infant behaviors and/or the mother's current and past emotional needs.

Subjects/Settings/Observation Procedures. Twenty-eight mothers in the eighth or ninth month of pregnancy were administered two questionnaires: one compiled by the investigator and one by the Michigan Screening Profile of Parenting (MSPP). The offspring were evaluated using the Neonatal Behavioral Assessment Scale on Days 1, 2, 3, 14, and 28. Maternal consoling of their neonatal infants was videotaped in the pediatrician's office during a well-child visit on Days 14 and 28.

Results and Discussion. Correlations of the consoling behavior of mothers with the degree of fussiness of their 2- and 4-week-old infants showed that (a) infants can be classified on a continuum of fussiness using terms from the Neonatal Behavioral Assessment Scale, (b) mothers do not use different consoling patterns for infants with differing degrees of fussiness, and (c) mothers do not improve in their ability to console their infants over a 2-week period as measured by less crying at 4 weeks compared with the 2-week visit.

## PART II: LANGUAGE ACQUISITION AND LANGUAGE AND AUDITORY ENVIRONMENTS IN THE FIRST YEAR OF LIFE.

During the first year of life the normal infant is thought to be repeatedly exposed to the language that the infant is expected to acquire. There are numerous questions concerning the experiences of the first year of life with regard to just what the language environment is, how variable it is from infant to infant, and what the infant is learning from it. The assumption underlying the current research is that the exposure and learning which occur during the first year are responsible for the foundation that permits productive language development in the second year. If the experiences which facilitate the foundational learning can be measured and progress during the first year of life described, it will be possible to identify infants having difficulties in the first year of life.

## STUDY 3a: EFFECTS OF ISOLETTES ON HEARING LOSS
(PIs: Horowitz and Linn)

One early neonatal environment which may have profound effects on developmental outcome is the Neonatal Intensive Care Unit (NICU). Infants born prematurely who survive a NICU experience have been shown to present a variety of medical and developmental difficulties. No detailed assessment of a NICU has been made, although many intervention programs have been implemented based on assumptions of environmental deprivation or overstimulation. This study was designed to assess various parameters of the University of Kansas Medical Center Neonatal Intensive Care Unit.

Subjects/Setting/Procedures. Thirty-five infants born prematurely and initially requiring intensive medical care were observed for 8 hours each during the "intermediate care" phase of their stay in the University of Kansas Neonatal Intensive Care Unit. Many aspects of the animate and inanimate environment were observed and recorded using a Datamyte computer-compatible data collection device. This was the same coding scheme used in the lower-class and middle-class samples so as to maximize comparisons across newborn environments.

For a subsample of 15 premature infants, sound level measurements were taken via a sound level meter placed in the infant's isolette. For each infant 2 hours of continuous dB levels were output to a strip chart recorder while the Datamyte code of infant behavior and environmental events were simultaneously being recorded.

Results and Discussion. Graphs were produced which described the levels of a wide range of environmental variables such as caregiver proximity, stimulation of the infant, animate and inanimate background auditory stimulation, and infant state, and vocal and visual behavior. These graphs represent levels of the coded variables averaged across the 35 infants and are specified in an hour-by-hour fashion to provide a descriptive account of a preterm infant's day in the intensive care environment. Hopefully, these descriptive data will be useful to researchers who plan interventions in ICU environments.

The KUMC ICU moved to a new hospital facility during the data collection period, providing a unique opportunity to assess the effect of the physical setting of the ICU on the durations of the coded infant, caregiver, and environmental variables, with staff control. Analyses of variance revealed that no coded variables were significantly different between the two physical settings. These data may indicate that our descriptors of premature infant experience in the ICU may be generalizable across ICU settings, rather than specific to a particular physical setting.

In order to determine if there were individual differences among the premature infants observed, background characteristics of the infants, such as birthweight, gestational age, and age-at-observation were correlated with the durations of coded events, summed across the

8 hours. Results indicated that age-at-observation was the most powerful predictor of infant state and visual behavior and caregiver attention to the infants. These results indicate that medical personnel tend to adjust their level of infant stimulation as the infants approach 1 month of age, and that the infants sleep less and regard their caregivers more as they develop.

### STUDY 3b: INFANT AUDITORY ENVIRONMENTS
(PIs: Horowitz and Ryan)

Recognizing that the mother is the primary contributor to the infant's auditory environment, this study was designed to describe the circumstances surrounding maternal vocalizations to the infant during an unstructured play session. Continuous coding of mother and infant behaviors allowed analysis of the amount and type of maternal vocalizations, as well as description of the infant's response to those vocaliations.

Observation of mothers playing with their infants leaves one with the distinct impression that mothers are utilizing periods of joint attention to teach their infants about the environment. This study was an attempt to delineate those behaviors which mothers exhibit during play which may comprise "teaching" strategies. Ways in which mothers direct and maintain their infants' attention, as well as the specific content they try to convey, were examined.

Subjects/Settings/Recording Procedures. Ten mother-infant pairs were videotaped during a 10-minute play session in their homes. Four pairs were observed longitudinally and six pairs were observed cross-sectionally. Longitudinal subjects were taped once at 4, 5, and 6 months of age. Cross-sectional subjects were taped on four consecutive days at either 4, 5, or 6 months of age. Changes in behavior as a function of age were examined for both longitudinal and cross-sectional subjects.

Results. The tapes were analyzed for patterns of change with respect to maternal language directed at the infant on a variety of dimensions: type/token ratio, patterns of intonation and content, and context of speech. No developmental patterns over the time span (3 months) studied were revealed.

Each mother engaged her infant in play using a great deal of language in these situations. Further, there was a great individual variation between mothers and not necessarily consistency within the mother's behavior from month to month. It is likely that we will finally conclude, following the last analyses now being carried out, that normal mothers employ a wide variety of language patterns and stimuli in interacting with their infants and that these do not necessarily involve consistency within or between mothers nor, over the time span studied, stable patterns of change.

## STUDY 4: INFANT DISCRIMINATION OF INTONATION PATTERNS

(PIs: Horowitz and Sullivan)

It has been proposed that mothers alter their speech patterns when talking to their infants in order to maintain the infant's attention. One particularly important aspect of mothers' speech is intonation patterns. It has been reported that when talking to infants, mothers use more rising (i.e., questions) than falling (i.e., statements) intonation patterns. The purpose of this study was to examine the infant's presumed "preference" for rising intonational patterns and to explore the parameters of infant attention to intonation.

Subjects/Settings/Procedures. Natural and computer-synthesized stimuli were recorded. The stimuli were nonsense syllables spoken in a declarative (falling intonation) and a questioning (rising intonation) manner. The stimuli were clearly identifiable and discriminable to a sample of adult subjects. These stimuli were presented to 2-month-old infants in the laboratory in an infant control paradigm. Infants presented with a pair of identical checkerboard slides and the presentation of one or the other of the auditory stimuli was contingent upon the infant looking to one or the other visual stimulus. The dependent measure was the amount of time the infant fixated on each stimulus as a function of its pairing with each of the auditory stimuli.

Results. The results of this study indicated that infant attention to each intonation pattern varied as a function of the type of stimulus presented. When each contour was spoken by a woman, infants looked significantly longer at the slide that was paired with the rising contour. When spoken by a man, however, some infants showed a preference for the rising intonation while others preferred the falling intonation. Finally, when the stimuli were computer-synthesized, infants tended to prefer listening to the falling intonation.

Discussion. These results suggest that in the natural environment, infants may tend to pay greater attention to rising over falling intonation patterns. However, this attention appears not to be related to intonation alone, but to some combination of acoustic cues characteristic of a questioning utterance.

After the primary study was completed, a secondary study was conducted to examine the extent to which preference for particular intonation patterns generalized to a more natural event--the combination of face and voice using a rising or falling intonation. Again, the dependent measure was the amount of attention infants devoted to each stimulus. The results indicated no apparent difference in the attention to questioning and declarative speech. From these two studies, it may be concluded that the high density of questions mothers use with infants may be very salient to the infant. However, the question-presentation situation is complex, and the infant's attention may be engaged by a variety and/or all of the variables (intonation, presence of an adult's face, volume, pacing of speech, etc.) that occur in close proximity. Further research is certainly warranted.

## STUDY 5: ADULT SPEECH TO INFANTS AND ADULTS

(PIs: Horowitz and Gaddis)

It has been observed that adults change their speech patterns when addressing speech to young infants. These pattern changes may function to increase the infant's attention to speech. Knowledge of the exact feature changes in adult speech to infants would permit us to describe and then to utilize those elements to increase infant attention to speech when necessary to prevent language delay. First, however, it is necessary to examine whether, in fact, these changes are either discriminable and/or especially salient to young infants.

Subjects/Setting/Procedures. Adults were asked to speak a designated passage to another adult and then to infants. Tape recordings of these two passages were then made and presented to 4-month-old infants using an infant control visual habituation paradigm. One of the auditory stimuli (i.e., either infant-directed or adult-directed speech) was presented contingent on the infant's attention to a visual stimulus. When visual attention decreased to a predetermined criterion, the auditory stimulus was changed. Discrimination was inferred if attention to the visual stimuli recovered in response to the new auditory stimulus.

Results and Discussion. Analyses comparing experimental and control group data failed to reveal any statistically significant differences. Increases in attention following stimulus change in the experimental groups were matched by comparable increases in attention in the control groups in which no stimulus change occurred. Given that a number of previous studies have established the sophisticated discrimination and processing competencies of young infants in the speech language domains, the results were initially surprising. When viewed, however, within the context of the dynamic ontogeny of language development in the first year, the results might be expected.

The present investigation utilized stimuli which focused solely upon the auditory attributes which distinguish infant-directed and adult-directed speech. Observations of adult and infant interaction show that auditory stimuli represent only a thread of a complex communicative fabric which includes numerous facial, gestural, tactile, and temporal stimuli. By the age of 4 months these paralinguistic features may have acquired an important function in attracting and maintaining an infants' attention. Auditory stimuli alone, while discriminable, may have acquired functional or categorical equivalence for the infant at 4 months. Further research directed toward the description of the role that these features play in the process of language development in the first year of life is likely to be a fruitful area for subsequent investigation.

## STUDY 6: DEVELOPMENT OF VOICE CATEGORIES IN INFANCY

(PIs: Horowitz, Miller, Younger, and Morse)

It has been reported that by 7 months of age, infants are able to discriminate and categorize the differences between male and female voices. The ability to attend to the varying acoustic features of different speakers, especially those that differentiate male and female voices, is critical to the development of phonetic and phonemic categories of speech. The development of attention to these cues during the first 6 months of life was investigated in this study.

Subjects/Setting/Procedures. The voices of six different females and six different males saying "hi" were employed as stimuli. Two-month-old and 6-month-old infants were presented with these stimuli within the infant control visual habituation paradigm described in Study 5 in this section. One group of infants in each age group was presented with a male-female discrimination, one group a male-male or female-female discrimination; the final group received a no-change control condition.

Results and Discussion. At 2 months, categorical discrimination is not present (i.e., female-female or male-male distinctions will be discriminated as readily as male-female distinctions). However, by 6 months the ability to categorize is emerging, resulting in better between-category (male-female) than within category (female-female) discriminations.

By 7 months of age, infants are capable of categorizing male and female voices. Successful categorization was not found to be entirely based upon fundamental frequency differences between categories but more likely was due to the infants' ability to integrate the matrix of features that comprise female and male voices. Such data suggest that by 7 months, infants are becoming sophisticated processors and organizers of language stimuli.

### STUDY 7: INTEGRATION OF AUDITORY AND VISUAL CUES IN SPEAKER CLASSIFICATION BY INFANTS

(PIs: Horowitz and Miller)

In assessing the development of the infant's perception of his/her social and linguistic environment, it is also important to investigate the nature of intermodal perception. It has been reported that infants (a) by at least 8 months of age can recognize the association of their parents' faces and voices, and (b) by 7 months can categorize male and female voices. The extent to which these two abilities can generalize to the association of *categories* of faces and voices was assessed in the present study.

Subjects/Settings/Procedures. Eight-month-old infants were presented with a visual paired-comparison task while listening to auditory stimuli. On each of four trials, the infant was presented with a pair of slides, one of a female face and one of a male face, together with either male or female voices. The dependent measure was the duration of visual fixation to the male and female faces as a function of which auditory stimuli were being heard.

Results. The data were analyzed with respect to the duration of fixation to the male faces during the presentation of male voices, and to the female faces during the presentation of female voices. The results indicated a significant effect for appropriate matching (i.e., longer fixations to male faces during male voice presentation and longer fixations to female faces during the presentation of female voices), suggesting that by 8 months of age infants can recognize the association between categories of unfamiliar faces and voices. In addition, however, there was also a strong tendency toward longer fixations to male than to female faces, independent of the associated voice presentation. This unexpected "male preference" is currently in the process of replication. We can conclude from this study that by 8 months of age infants have been able to impose a large degree of perceptual order onto their social and linguistic world.

## STUDY 8a: INFANT PERCEPTION OF FACIAL EXPRESSION FROM PARTIAL FEATURES OF THE FACE

(PIs: Horowitz and Nelson)

Another very important aspect of the infant's learning about its environment, particularly the language-learning environment, concerns the perception of and response to different facial expressions of emotion. It is possible that infants and young children who are deficient in communicative competence may have difficulty with the recognition of and appropriate response to emotional expressions. It has been shown that infants of about 6 months of age can discriminate between different facial expressions, and the present study attempted to delineate some of the underlying features of this discrimination.

Subjects/Settings/Procedures. The visual stimuli employed in this study were the faces of models expressing the emotions surprise and fear and various cancatenations of the specific features comprising these expressions. Six-month-old infants were initially presented with a pair of identical slides--surprise expression--until they reached a cumulative looking time of 40 seconds. Following this familiarization phase, a second pair of slides was presented. One of the slides was identical to the familiarization stimuli, and the other contained a change in either (a) eyes only, (b) mouth only, or (c) eyes and mouth. The dependent measure consisted of the amount of differential attention the infant devoted to the novel versus the familiar stimulus.

Results and Discussion. The results of this study indicated that infants discriminated the two facial expressions only when the eyes had changed. When either the mouth alone or the eyes and mouth were different, no discrimination was evidenced. This suggests that the eyes are very powerful sources of information about emotion and that infants learn this association very quickly. Together with other studies that report attention to eyes during communicative interactions, the present study suggests that young infants learn about the nature of communication largely through information obtained through the eyes. The results have implications for potential sources of deficits in those children with language and communication disorders.

## STUDY 8b: THE USE OF HOLOGRAPHY AS A MEANS OF EXAMINING INFANT FACE PERCEPTION

(PIs: Horowitz and Nelson)

The human face has long been considered to be an important source of communication between infants and other people. Theories of attachment and studies of parent-infant interaction have emphasized the importance of the parent's face as a stimulus in the infant's environment. Research conducted over the past two decades has primarily focused on how infants perceive faces and come to understand the information contained in faces. The majority of this research has tested infants with black-and-white still photographs. While we have learned a great deal from this research, the extent to which one can generalize infants' abilities using such stimuli to the way infants perceive faces in the natural environment is unknown. The goal of the present study is to develop and use a new technique, holography, as a means of examining infant face perception. The rationale underlying the use of holography is that holograms may more accurately reflect the sorts of faces infants see in their everyday world (i.e., faces that move, are in three dimensions, and are in color), thus increasing the generalizability of laboratory studies of face perception.

Subjects/Setting/Procedure. Two- and five-month-old infants living in the greater Lawrence area served as subjects in the studies. The infants were tested at the Infant Research Laboratory at the University of Kansas, supervised by Dr. Frances Degen Horowitz. The principal question under investigation was the extent to which movement and "realism" of the face facilitates recognition of facial expression. This was accomplished by the incorporation of holograms and photographs of faces into an habituation/recovery paradigm. There were two experimental conditions in the study. In one, infants were habituated to a colored, moving hologram of a female face posing in one expression, and tested on their ability to discriminate this expression from a second expression (same woman, same colored hologram). The second condition was identical to the first, with the exception that the hologram was stationary.

Results and Discussion. In the first experiment, 5-month-old infants were asked to discriminate a change in facial expression and pose displayed by a single female model in a holographic stereogram that either moved or remained stationary. The results indicated that infants responded similarly to the hologram regardless of whether or not it moved, and that the infants did not evidence discrimination of the change in expression and pose. Because previous research had indicated infants of this age to be quite sophisticated in their discrimination of two-dimensional representations of faces, these results were surprising. There was some suggestion that the three-dimensional information in the hologram may have overriden the index of discrimination of the change in expression and pose.

To test this suspicion, a group of 2-month-old infants (an age by which it was thought stereopsis had not yet developed) was tested in a second experiment using the same moving hologram as in Experiment 1.

It was predicted that if infants in Experiment 2 discriminated the change in expression and pose, they did so without the benefit of stereoscopic depth perception. The results from this experiment indicated that infants could make this discrimination, reinforcing the interpretation that the lack of evidence for discrimination in the first experiment was based on interference from the three-dimensional information.

To evaluate further what 5-month-old infants attend to when they inspect either a moving or stationary hologram, a third experiment was conducted. One group of infants in Experiment 3 was familiarized to one scene in a moving hologram and tested on the same scene with the movement component removed, while a second group was familiarized to one scene in the stationary hologram and tested on the same scene with a movement component added. It was predicted in the first case that if infants were able to abstract information denoting expression and pose from the moving hologram and generalize this information to the stationary hologram, they would show no increase in looking at the change point. It was predicted in the second case that if infants were able to elicit scene changes with eye-head movements from the hologram during the stationary familiarization phase, they would also show no recovery of fixation at the change point (i.e., when the hologram started moving).

The results from Experiment 3 confirmed the first prediction, but not the second, suggesting that 5-month-old infants were able to generalize the expression/pose information abstracted from a moving scene to a stationary scene, but were not able to intentionally elicit scene changes during the stationary familiarization phase. More importantly, the finding that infants first presented with a moving hologram and tested with a stationary hologram fail to show recovery at the change point suggests that attention to a holographic stereogram can be made to habituate if one of the components of the hologram to which infants might attend (i.e., movement) is removed.

When the individual data from all three experiments were inspected, it was found that (a) the group data for the stationary hologram condition in Experiment 1 may have been inflated by scores of one or two subjects, (b) infants in all three experiments, regardless of age or condition, required approximately four trials after peak responding to reach criterion in Phase I, and (c) there was no evidence to support McCall's (1979) notion that the shorter the retention interval between peak responding and the introduction of a new stimulus, the greater the magnitude of recovery.

## STUDY 9: BEHAVIORAL AND PSYCHOPHYSIOLOGICAL RESPONSIVITY TO AUDITORY STIMULI DURING THE NEWBORN PERIOD

(PIs: Horowitz, Byrne, and Miller)

Experience with and response to auditory/linguistic stimulation begins at birth. Thus, the nature of the newborn's attention to different features of auditory stimulation is an important issue. Although many investigators have examined auditory responsivity in newborns, none has examined the extent to which different response systems are organized (i.e., coordinated in infants' responses to auditory stimuli). There is evidence that certain at-risk infants (e.g., prematures) are characterized by their lack of organization and that exploring the degree of response organization in the normal newborn will increase understanding of the nature of deficits in a potentially handicapped population. The present study examines this organization by making simultaneous measurements in several response systems.

Because many differences exist among studies in the areas of auditory and linguistic stimulation, integrative statements about this literature are very difficult. Some of these problems include: (a) differences in initial state (and/or no statement regarding prestimulus state), (b) differences in the dependent measures employed (e.g., behavioral vs. psychophysiologic), and perhaps most importantly, (c) inadequate specification of the stimuli.

Subjects/Settings/Procedures. The present study examined both psychophysiologic (i.e., heart rate) and behavioral (i.e., state changes, bodily activity) responses of 24 neonates (30-72 hours of age) to auditory stimuli varying along two parameters that have been suggested as important to neonatal response, specifically, rate of presentation and form of presentation (i.e., continuous vs. intermittent). The stimuli were variations of the dipthong (ai) which was computer-synthesized to vary independently (a) the duration of the transition between the two vowels, a rough measure of rate (fast = 0 msec transition, slow = 500 msec transition), and (b) the form of presentation (continuous = no interstimulus interval, intermittent = 500 msec interstimulus interval). Thus, four stimulus conditions were generated: 1) Fast Intermittent (FI), 2) Fast Continuous (FC), 3) Slow Intermittent (SI), and 4) Slow Continuous (SC). In each testing session, infants heard two of these four conditions (either FI and FC or SI and SC). Each of the two stimulation periods began with the infant in a state of light sleep and lasted 2 minutes. The order of presentation of the two conditions was counterbalanced across infants with an interval of 10-15 minutes separating the two stimulation periods. The heart-rate (HR) data were recorded on audio tape from which successive interbeat (R-R) intervals were computed; infant state was recorded continuously by a blind observer with a real-time event recorder; and bodily activity was recorded continuously via a stabilometer onto a polygraph.

Results. Second-by-second analyses of the HR data revealed that infants exhibited HR acceleration to stimulus onset across all conditions, thus replicating a well-established finding in this literature. In addition, however, an analysis of variance indicated that the shape and magnitude of this acceleratory response varied as a function of both transition duration and form of presentation (i.e., continuous vs. intermittent), thereby demonstrating discrimination of these features. Reduction of the behavioral data resulted in the following measures: (a) number of state changes, (b) direction of state change, (c) total amount of body activity, and (d) number of startle responses observed. All of these measures also yielded differences as a function of stimulus condition. Thus, these results have shown (a) that differential response to auditory stimuli was evident in all response modes and, (b) that rate of presentation (as defined here) and form of presentation were important features contributing to this discrimination. An additional, but unexpected, finding in this study was an apparent dissociation between the HR and the behavioral data in the patterning of response across the four conditions. This lack of clear correspondence between these two response systems, although requiring replication, may have important implications for the claims of response organization in the newborn.

## Summary

1. Two to four-month-old infants appear to be very responsive to intonation patterns associated with "motherese". However, when these characteristics are embedded in complex natural stimuli they are no more powerful than complex natural stimuli that do not contain "motherese" aspects. In naturally occurring situations of play interaction between infants and mothers the mothers use a great deal of highly complex language that contains motherese and non-motherese characteristics. From several of the studies that are described on the following pages we can conclude that complex language is a powerful stimulus for maintaining and recruiting attention in normal young infants. It now remains for comparable studies to be carried out with high-risk populations to determine whether there are some high-risk infants who show different patterns of attending to complex language stimuli and/or who are not particularly responsive to such stimuli. It is possible that these are the infants who may be particularly prone to later language delays and disorders. If this were the case then it would be possible to develop techniques for early identification of these infants.

2. The normal infant is typically exposed to language stimuli in the context of facial expressions and the movement of facial parts. We have found that movement is a very salient stimulus for young infants, that young infants show subtle discriminations of change in speed of movement and that movement plays a role in the discrimination of facial "scenes". It remains to be determined whether high-risk infants are similarly sensitive. Such differences as they exhibit in comparison to normal infants may provide important clues as to the areas where risk and normal infants process naturally occurring language differently.

3. Our observations of the premature infant in the neonatal intensive care unit has revealed patterns of stimulation that appear to be different than those which occur in the home setting. More background auditory stimulation as well as different patterns of infant behavior occur in the two settings. The implications of these findings are related to documenting what kinds of functional difference may confound the developmental course of the premature infant who is a resident in a neonatal intensive care unit for some period of time.

# PROGRESS CHART FOR RESEARCH STUDIES

| DEVELOPMENTAL GUIDES TO INTERVENTION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ■ Activities Completed<br>◣ Activities in Progress<br>▩ Activities Projected<br>☰ Studies Repeated<br>NA Not Applicable | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
| **GUESS** | | | | | | | | | | | |
| 10. QUANTITATIVE ASSESSMENT OF MOTOR DEVELOPMENT | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | ■ |
| 11. LONGITUDINAL ASSESSMENT OF MOTOR DEVELOPMENT | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | ■ |
| 12. ASSESSMENT PROCEDURES TO PROMOTE MOTOR DEVELOPMENT | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | ■ |

FIGURE 4

## DEVELOPMENTAL GUIDES TO INTERVENTION

QUESTION B: CAN THE SPECIFIC SEQUENCE OF SENSORY/MOTOR DEVELOPMENT IN NORMAL AND SEVERELY HANDICAPPED INFANTS AND YOUNG CHILDREN BE DETERMINED BY DEVELOPING MEASUREMENT PROCEDURES SENSITIVE TO SMALL INCREMENTS IN SENSORY/MOTOR ACQUISITION? (Investigator: Guess)

### Statement of Research Problem

Existing developmental scales and checklists have numerous limitations when used to measure the sensory/motor acquisition of infants and young children who are handicapped, and especially for those children who demonstrate pronounced developmental delays. These traditional instruments use a presence/absence strategy to measure sensory/motor acquisition; the behavioral increments are too large; and they imply that handicapped infants also follow a normal sequence of development.

Numerous people (e.g., Haring, 1976; Mira, 1977) have pointed to the need to develop more sensitive and fine-focus procedures to assess sensory/motor acquisition among handicapped infants and young children. These procedures allow for earlier and more accurate intervention decisions, more sensitive assessments of early intervention programs, and a method to compare specific education and treatment techniques. More fine-focus quantitative assessment procedures also have the potential for the early identification of handicapping conditions and the potential for identifying covariations in behavior that might lead to better curricula for handicapped children.

The purpose of this project has been threefold: 1) to design and develop quantitative procedures (e.g., rate, duration, body angle) to measure sensory/motor acquisition among handicapped and nonhandicapped infants and young children (Studies 10a-10n); 2) to demonstrate reliability of the measures across observers, children, and time (Studies 11a-11m); and 3) to demonstrate the validity and practical application of the measures in education/treatment settings and in the collection of longitudinal data (Studies 12a-12h).

### STUDY 10a: PROCEDURES FOR MEASURING VISUAL FIXATION (PIs: Janssen & Eye)

Purpose. Procedures were developed to quantifiably measure visual fixation and were tested for interobserver reliability across observers.

Subjects/Setting. Three severely handicapped students (ages 12, 14, & 15) and one normally developing infant (age 4-8 weeks) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. Measures of the frequency, duration, and mean duration of visual fixation of preferred objects were obtained when the child was in a sitting, sidelying, and prone position. A grid divided into nine sections and positioned at two distances from the child, was used to determine placement for presentation of stimulus items.

Results. High interobserver reliability scores were obtained for all subjects across position, grid sections, and grid distances for frequency and duration of visual fixations. Performance data indicate that handicapped subjects fixated on objects for longer durations than the nonhandicapped infant.

Discussion/Application. This measurement technique provides an assessment tool that is inexpensive, simple to administer, and reliable for measuring frequency and duration of visual fixations. The quantifiable procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual orientation.

Recommendations for further research. Future research should be conducted with larger numbers of subjects. Longitudinal data is needed to test the reliability of the procedures over time, to validate the developmental emergence sequence of the skills, to demonstrate the effectiveness of the procedures for measuring acquisition of visual skills as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package.

### STUDY 10b: PROCEDURES FOR MEASURING VISUAL TRACKING
(PIs: Janssen & Humphrey)

Purpose. Procedures were developed to quantifiably measure visual tracking and were tested for interobserver reliability across observers.

Subjects/Setting. Three severely handicapped students (ages 7, 9, & 10) and one normally developing infant (age 4-8 weeks) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. A measure of the distance the eyes followed a preferred object was obtained when the child was in a sitting, sidelying, and prone position. A grid divided into nine sections and positioned at two distances from the child, was used to determine movement pathways of stimulus objects to be tracked.

Results. High interobserver reliability scores were obtained for all subjects across positions, tracking pathways, and grid distances. Performance data on all subjects indicate that horizontal pathways were most easily tracked and circular paths were most difficult to track.

Discussion/Application. This measurement technique provides an assessment tool that is inexpensive, simple to administer, and reliable for measuring visual tracking behavior. The quantifiable procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual orientation.

Recommendations for further research. Future research should be conducted with larger numbers of subjects. Longitudinal data is needed to test the reliability of the procedures over time, to validate the developmental emergence sequence of the skills, to demonstrate the effectiveness of the procedures for measuring acquisition of visual tracking skills as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package.

## STUDY 10c: PROCEDURES FOR MEASURING VISUAL SCANNING
(PIs: Janssen & Fernandez)

Purpose. Procedures were developed to quantifiably measure visual scanning and were tested for interobserver reliability across observers.

Subjects/Setting. Three severely handicapped/visually impaired students (ages 6, 16, & 18) and one normally developing infant (6-7 months) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. Measures of the frequency and mean frequency of visual contacts with preferred objects in the scan path were obtained when the child was in a sitting, sidelying, and prone position. A grid divided into nine sections and positioned at two distances from the child, was used to arrange stimulus items into various scanning arrays.

Results. High interobserver reliability scores were obtained for all subjects across positions, scanning arrays, and grid distances for frequency of visual scanning. Performance data do not indicate any specific patterns of scanning for the various arrays, positions, or distances of the grid from the child.

Discussion/Application. This measurement technique provides an assessment tool that is inexpensive, simple to administer, and reliable for measuring frequency of scanning behavior. The quantitative procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual orientation.

Recommendations for further research. Future research should be conducted with larger numbers of subjects. Longitudinal data is needed to test the reliability of the procedures over time, to validate the developmental emergence sequence of scanning skills, to demonstrate the effectiveness of the procedures for measuring acquisition of visual scanning as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package.

## STUDY 10d: PROCEDURES FOR MEASURING REACH
(PIs: Mulligan & Proctor)

Purpose. Procedures were developed to define and quantifiably measure emerging reach skills.

Subjects/Setting. Four multiply handicapped children (ages 1, 4, 4, & 5) and one normally developing infant (age 3 months) served as subjects. Assessment of one of the handicapped children was performed in a quiet corner of a preschool classroom. The remaining four subjects were assessed in a quiet room in their homes.

Procedures/Data Collection. Observations measured the occurrence or non-occurrence of movement, the type of movement used, the occurrence or non-occurrence of contact with the stimulus object, the duration of movement, and the arm or arms used.

Results. High reliability scores were obtained across most of the coded descriptors in all positions and with all the children tested.

Discussion/Application. The measurement procedures provide information important to the child's educational programming. Use of these techniques to compare development of handicapped and nonhandicapped children will pinpoint similar and dissimilar tracks of development.

Recommendations for further research. Future research using these methods with handicapped and nonhandicapped infants and children will provide information allowing comparisons between the two populations. Such research should address the rate of skill acquisition in addition to similarities and differences in development.

### STUDY 10e: PROCEDURES FOR MEASURING GRASP
(PIs: Mulligan & Wright-Neese)

Purpose. Procedures were developed to define and quantifiably measure emerging grasp skills.

Subjects/Setting. Five multiply handicapped children (ages 3, 3, 4, 4, & 4) and one normally developing infant (age 10 months) served as subjects. The nonhandicapped infant was observed at home. The handicapped children were observed in a preschool classroom.

Procedures/Data Collection. Procedures measured the use of fingers, the use of the right or left hand, and the use of the palm or the fingertips in the grasp response. Two methods of grasp were delineated: measurement of voluntary grasp and measurement of reflexive grasp.

Results. High reliability scores were obtained for: one nonhandicapped subject and four handicapped subjects in the sitting position; one handicapped student in the standing position; and one handicapped student in the sidelying position. Frequency data were secured on individual digit use, hand preference, and fingertip or palmar stabilization over four different stimulus objects.

Discussion/Application. The data reveals a number of trends: Specific digit use is consistent across positions; hand preference is significantly evident at an early point and is consistent across positions; fingertip or palmar stabilization of objects is somewhat independent of object size; as the first three digits begin to predominate in grasp topographies so does fingertip stabilization; and finally, reflexive grasp appears to be a subjective finding not amenable to quantitative measurement (in this study)--nor is there a conclusive bridge between reflexive and voluntary grasp measurement methodology.

Recommendations for further research. Future research should further substantiate reliability while providing a comparison of handicapped and nonhandicapped children's rates of acquisition.

STUDY 10f: PROCEDURES FOR MEASURING RELEASE
(PIs: Mulligan & Cronan)

Purpose. Procedures were developed to define and quantifiably measure emerging release skills.

Subjects/Setting. Three severely handicapped children (ages 3, 4, 4) and one developing infant (age 11 months) served as subjects. The three handicapped subjects were assessed in a preschool for severely/multiply handicapped children located at the university medical center. The nonhandicapped infant was assessed at home.

Procedures/Data Collection. Percentage data were collected to measure the digits involved in release, the topography of the forearm, support of the arm, release against a resisting surface and release into a container.

Results. Data indicated emerging hand dominance and development of a pincer type release from the radial side of the hand. High interobserver reliability was obtained for all children in all positions, across all descriptors.

Discussion/Application. Use of these techniques to compare development of handicapped and nonhandicapped children will pinpoint similar and dissimilar tracks of development. The quantifiable procedures described will assist teachers of severely handicapped children in developing and monitoring effective educational programs.

Recommendations for further research. Future research, in determining the validity of this instrument, should formally address the issue of the difference between mental retardation and development delay.

STUDY 10g: PROCEDURES FOR MEASURING TRANSFER
(PIs: Mulligan & Mellard)

Purpose. Procedures were developed to define and quantifiably measure emerging transfer skills.

Subjects/Setting. Three severely handicapped children (ages 3, 4, 5) and one normally developing infant (age 7 months) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. Utilizing three different body positions, seven transfer descriptor codes as well as three trisection codes were used to assess student performance. Descriptors identified to measure the transfer response were: use of a third surface, location in relation to the body, direction, percent occurrence, and the effect of time.

Results. High interobserver reliability scores were obtained for all three handicapped students as well as the nonhandicapped infant for all of the measures. Reliability was generally higher for the descriptor codes than for the trisection codes. The nonhandicapped infant and the highest functioning handicapped subject both had a greater repertoire of responses than the more handicapped subjects.

Discussion/Application. Use of these techniques to compare development of handicapped and nonhandicapped children will pinpoint similar and dissimilar tracks of development. The quantifiable procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs.

Recommendations for further research. Future research should be conducted to include larger numbers of subjects including those with visual and hearing impairments. Longitudinal research is also needed to verify the developmental emergence sequence of the skills, to demonstrate the performance growth of subjects, and to further document the reliability and validity of the procedures.

### STUDY 10i: PROCEDURES FOR MEASURING SITTING
### (PIs: Warren & Barnes)

Purpose. Quantitative assessment procedures were designed to measure and record the behavioral components of sitting and to provide a sensitive measure that reflects small changes in sitting skill.

Subjects/Setting. Seven severely handicapped children, ages 6 to 14, served as subjects. The subjects were assessed at a state residential facility in either an occupational therapy room or the student's classroom.

Procedures/Data Collection: The following skills were measured: supported sitting; propped sitting; come to sit from sidelying; come to sit from supine using trunk flexion; protective extension to the sides in sitting; protective extension to the back in sitting; and independent sitting. The measurement procedures included frequency counts, time samples and duration counts.

Results. All interobserver reliability scores averaged over 90%.

Discussion/Application. The measures developed to index these skills are unusually sensitive to small behavior changes and increments, compared to more traditional assessments. The use of duration and frequency measures to index the functionality of each response measured provides a much more detailed picture of the child's functioning level within each skill. The assessment procedures developed provide a means to assess the sitting skill of severely/multiply handicapped children and to evaluate the effectiveness of motor intervention programs.

Recommendations for further research. Longitudinal studies would be particularly valuable if combined with the assessment procedures which are sensitive to small behavioral changes. Additionally, further research on the effect of nonrepetitive trials would be valuable.

### STUDY 10j: PROCEDURES FOR MEASURING ROLLING
(PIs: Rues, Lehr, & Day)

Purpose. Procedures were developed to measure the acquisition of segmental and mobility rolling.

Subjects/Setting. Two handicapped preschoolers, ages 7 months and 3 years, and two nonhandicapped infants, age 5 months (observed until 7 months of age) served as subjects. The handicapped children were observed in their special education preschool classroom, and the nonhandicapped children were observed in their homes.

Procedures/Data Collection. Segmental rolling from prone, supine, and sidelying was assessed with measures of degrees of trunk rotation, amount of trunk rotation, and the amount of time taken by the child to roll. Rolling mobility assessed the number of complete rolls, the maximum degrees of body rotation, the distance the child travelled, and the time required to move the distance.

Results. Mean reliability ranged from 79% to 100 % for all measures and all subjects. Degrees of body rotation had the lowest measures of reliability, and degrees rolled and duration of rolling had equally high reliability scores.

Discussion/Application. The reliability scores indicate that this measurement procedure provides a reliable method for measuring segmental rolling and rolling mobility. These procedures could be used to assimilate and analyze data gathered on both handicapped and nonhandicapped children over a period of time, and it may explicate some of the similarities and differences between the two populations in their development of rolling behavior.

Recommendations for further research. By observing infants from the newborn period and using these procedures, important comparisons may be made regarding the development and quality of rolling. Future research may also shed some light on the relation of rotation to the ability to assume an erect posture.

### STUDY 10k: PROCEDURES FOR MEASURING CREEPING
(PIs: Lehr, Noonan, & Kremer)

Purpose. Quantitative measurement procedures were developed to assess the acquisition of creeping behaviors.

Subjects/Setting. One nonhandicapped infant (9 months old) and three handicapped children (ages 4 to 13) served as subjects. The handicapped children were assessed in their school or in their home. The nonhandicapped infant was observed at home.

Procedures/Data Collection. Three aspects of creeping--maintenance, movement, and locomotion--were assessed. Measures included duration, frequency, distance, pattern, and rate.

Results. Over 80% interobserver reliability was obtained on all sessions for every child. Movement reliability scores yielded the highest interobserver agreement.

Discussion/Application. High reliability scores were achieved on all three stages of creeping behavior for the three handicapped children as well as the one nonhandicapped infant. Since change from creeping to crawling in the nonhandicapped infant's performance data could be detected, one could infer that changes in a child's behavior, as the child progresses from crawling to creeping, could be noted from this assessment.

Recommendations for further research. These measures may be applied on a longitudinal basis to reliably measure the performance of both handicapped and nonhandicapped individuals. Once performance data are collected, comparisons can then be made between the two populations. Additionally, the assessment may provide sensitive measurement for the monitoring of classroom intervention programs for severely handicapped students.

## STUDY 101: PROCEDURES FOR MEASURING CRAWLING
(PIs: Lehr, Noonan, & Leitner)

Purpose. Quantitative measurement procedures were developed to assess the acquisition of crawling behaviors.

Subjects/Setting. One nonhandicapped child (7 months old) and three handicapped children (one 4 year old and two 6 year olds) served as subjects. The handicapped children were assessed within their special education preschool or elementary school classrooms. The nonhandicapped infant was observed in her home.

Procedures/Data Collection: Crawling behaviors were assessed within the categories of maintenance, movement, and locomotion. Measures included duration, frequency, distance, pattern, and rate.

Results. Mean reliability for all subjects across all sessions ranged from 82% to 100%. Duration measures yielded the highest interobserver agreement for all categories of crawling. The highest reliability scores were obtained for the category of movement.

Discussion/Application. The desired goal for this study was reliability of the current procedures of measurement based on precise definitions and coding system--a system to measure finer increments of crawling. It is hoped that these quantitative assessment procedures will be used to provide longitudinal data comparing handicapped and nonhandicapped infants and young children in their motor acquisition.

Recommendations for further research. Further research efforts should consider condensing the number of arm and leg position codes, defining the "abnormal tone" code as "out of position," assessing the crawling pattern across several sessions, and finally, shortening the time period in which the pattern is recorded.

## STUDY 10m: PROCEDURES FOR MEASURING WALKING

(PIs: Lehr, Noonan, & Shepherd)

Purpose. Quantitative procedures sensitive enough to measure the small changes in development of walking skills were developed.

Subjects/Setting. Four multiply handicapped children (ages 2 to 6 years) and one nonhandicapped child (11 months of age) served as subjects. The multiply handicapped children were observed in their special education preschool classroom and the nonhandicapped infant was assessed in her home.

Procedures/Data Collection. Walking was assessed according to three categories: pulling to stand, standing, and walking. Pull to stand measures indicated two leg positions in pulling to stand, using three types of support. Standing and cruising measures included the position of the lower extremities (frequency), movement such as bouncing and stepping (20 second time sampling), and duration. Walking measures included the number of steps taken, the distance walked, the time required to move the distance, the average stride length, and the wrist position.

Results. Individual and mean interobserver reliability scores were very high, ranging from 83% to 199%. The mean reliability across subjects, behaviors, and sessions was 100% for pulling to stand, 99% for standing and cruising, and 98% for walking.

Discussion/Application. The data indicates that walking behaviors can be measured quantifiably with very high reliability. Such measures could be used longitudinally to track and compare the development of handicapped and nonhandicapped children. Additionally, the assessment could be used to assess the effectiveness of intervention programs among handicapped children.

Recommendations for further research. Future research should include more detailed measures of the arms positions used by the child in the supported standing position. Qualitatively different behaviors were noted by the investigators that were not coded in the assessment. Additional measurement procedures for other behaviors associated with standing might also contribute to the overall usefulness of this assessment. Specifically, measures for independent attainment of standing from the floor, standing from a chair, sitting to a chair from standing, and sitting to the floor from standing are necessary.

## STUDY 10n: PROCEDURES FOR MEASURING STANDING AND SITTING

(PIs: Lehr, Noonan, & Luddy)

Purpose. Quantitative measurement procedures for the various components of standing and sitting behaviors were developed to obtain reliable and accurate measures of severely handicapped children's motor behavior.

Subjects/Setting. Five handicapped children (ages 2 to 8 years), and one nonhandicapped infant (11 months old) served as subjects. The handicapped children were assessed in their special education preschool or elementary school classrooms. The nonhandicapped infant was assessed in his home.

Procedures/Data Collection. Standing was assessed as coming to stand and moving from standing to sitting. The floor or a chair were used for sitting positions, and standing positions were with or without the support of a table. Foot and hand positions were measured according to their placement on a grid. Leg positions were coded with a time-sampling measurement, and the duration of movement into the position was recorded. The position of the buttocks and trunk were also noted.

Results. Interobserver reliability for each subject across behaviors ranged from 63% to 100% for the six categories of standing and sitting behavior. Disagreement occurred most frequently in the recording of the foot positions on the grid.

Discussion/Application. The data indicate that, generally, the procedures reliably measure behaviors involved in assuming a standing position from a chair (with and without a table for support) and from the floor, as well as the attainment of a sitting position to a chair and to the floor. Additional measures applied on a longitudinal basis to handicapped and nonhandicapped children would provide more useful and accurate information on intervention needs of the severely/multiply handicapped population.

Recommendations for further research. The placement of the child's hands and feet while attaining a standing position were not consistently measured reliably. Effective alternative procedures must be identified.

## STUDY 11a: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF VISUAL FIXATION SKILLS AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PI: Janssen)

Purpose. Quantitative procedures to measure visual fixation were modified slightly and tested for interobserver reliability over time.

Subjects/Setting. Three severely handicapped students (ages 15, 16 & 17) and one normally developing infant (age 13-23 weeks) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. Measures of the frequency, duration, and mean duration of visual fixation of preferred objects were obtained when the child was in a sitting position. A grid divided into nine sections and positioned at only one distance from the child, was used to determine placement for presentation of stimulus items. Data were collected once every one to two weeks for a period of three months.

Results. High interobserver reliability scores were obtained for all subjects across grid sections and over the three months of observation. The performance scores for the nonhandicapped infant showed an increase in visual fixation skill level; however, the handicapped subjects did not appear to acquire fixation skills over the three months of observation.

Discussion/Application. This measurement technique provides an assessment tool that is inexpensive, efficient, simple to administer, and reliable for measuring frequency and duration of visual fixations over time. The quantifiable procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual orientation.

Recommendations for further research. Future research should be conducted with larger numbers of subjects. Longitudinal data is needed to validate the developmental emergence sequence of the skills, to demonstrate the effectiveness of the procedures for measuring acquisition of visual skills as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package.

### STUDY 11b: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF VISUAL TRACKING SKILLS AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Janssen & Komisar)

Purpose. Quantitative procedures to measure visual tracking were modified slightly and tested for interobserver reliability over time.

Subjects/Setting. Three severely handicapped students (ages 6, 7, and 10) and one normally developing infant (age 8-20 weeks) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. A measure of the distance the eyes followed a preferred object was obtained when the child was in a sitting position only. A grid divided into nine sections and positioned at only one distance from the child, was used to determine movement pathways of stimulus objects to be tracked. Data were collected once every one to two weeks for a period of three months.

Results. High interobserver reliability scores were obtained for all subjects across tracking pathways and over the three months of observation. The performance scores for the nonhandicapped infant showed an increase in visual tracking skills, however the handicapped subjects did not appear to acquire fixation skills over the three months of observation. Circular tracking resulted in the lowest percentage of tracking behavior for all subjects.

Discussion/Application. This measurement technique provides an assessment tool that is inexpensive, time-efficient, simple to administer, and reliable for measuring visual tracking behavior over time. The quantitative procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual orientation.

Recommendations for further research. Future research should be conducted with larger numbers of subjects. Longitudinal data is needed to validate the developmental emergence sequence of tracking skills, to demonstrate the effectiveness of the procedures for measuring acquisition of visual tracking skills as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package.

STUDY 11c: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF VISUAL SCANNING SKILLS AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN
(PIs: Janssen & Vogt)

Purpose. Quantitative procedures to measure visual scanning were modified slightly and tested for interobserver reliability over time.

Subjects/Setting. Three severely handicapped students (ages 3, 5, & 6) and one normally developing infant (age 5-7 months) served as subjects. The three severely handicapped subjects were assessed in a standard-sized classroom while the class was in session. The normally developing infant was assessed in the home.

Procedures/Data Collection. Measures of the frequency and mean frequency of visual contacts with preferred objects in the scan path were obtained when the child was in a sitting position only. A grid divided into nine sections and positioned at only one distance from the child, was used to arrange stimulus items into various scanning arrays. Data were collected once every one to two weeks for a period of three months.

Results. High interobserver reliability scores were obtained for all subjects across scanning arrays and over the three months of observation. The performance scores for the nonhandicapped infant showed an increase in visual scanning skills; however, the handicapped subjects did not appear to acquire scanning skills over the three months of observation. Less visual impairment and higher cognitive functioning seemed to correlate with greater frequency of scanning.

Discussion/Application. This measurement technique provides an assessment tool that is inexpensive, time-efficient, simple to administer, and reliable for measuring frequency of visual scanning over time. The quantitative procedures will assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual orientation.

Recommendations for further research. Future research should be conducted with larger numbers of subjects. Longitudinal data is needed to validate the developmental emergence sequence of scanning skills, to demonstrate the effectiveness of the procedures for measuring acquisition of visual scanning skills as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package.

## STUDY 11d: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF REACH AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Cutsinger & Esquith)

Purpose. This study replicated the use of quantitative assessment procedure for the measurement of emerging reach skills.

Subjects/Setting. Three severely handicapped children (ages 9, 12, & 13) and one normally developing infant (age 7 months) served as subjects. The three handicapped subjects were assessed in the bedroom area of an institution. The nonhandicapped subject was assessed at home.

Procedures/Data Collection. The observations of arm/hand reaching movements were measured by the occurrence or nonoccurrence of: movement; contact with stimulus object; the type of movement used; the use of the testing surface as support, if contact was made; the duration of the arm movement; and the arm or arms used in the movement.

Results. High interobserver reliability was obtained following the use of an operationally defined behavior coding system which measured the distance of the reach behavior, topographical characteristics of the reachskill, and latency of the reach response. Performance data indicated that the reach assessment tool was sensitive to measuring underdeveloped, emerging and mature reach behavior patterns.

Discussion/Application. Results indicate that the reach assessment is successful in quantitatively measuring the developmental sequence of reach behavior in handicapped and nonhandicapped children and infants.

Recommendations for further research. The assessment could be expanded to include different height levels according to body position, and a time interval section could be expanded to include a column for sustained reach.

## STUDY 11e: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF GRASP AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Mears & Esquith)

Purpose. This study replicated assessment procedures intended to quantifiably measure emerging grasp skills.

Subjects/Setting. Three severely handicapped children (ages 2, 4, & 5) and one normally developing infant (age 8 months) served as subjects. The three handicapped children were assessed in a preschool and the nonhandicapped infant was assessed at home.

Procedures/Data Collection. Procedures were used to assess voluntary grasp in three positions. Four stimulus objects were presented to the right and left hands three times in each session. An objective method of coding and recording grasp responses was obtained by dividing the hand into seven distinct areas. Frequency data were secured on specific digit use, fingertip or palmar stabilization and hand preference.

Results. High interobserver reliability data were obtained for the procedures across all descriptors and positions. Hand preference was consistent with teacher and parental reports. Hand preference was consistent across time and positions. Specific digit use was consistent across positions. Direct correlation appeared between tip use and the use of digits 1, 2, and 3 across time. Three of the four subjects exhibited gradual ulnar to radial progressions of digit use of increased tip use across time.

Discussion/Application. Application of this assessment instrument with handicapped and nonhandicapped children may provide useful data in documenting the handicapped child's developmental acquisition of grasp skills.

Recommendations for further research. Further research in determining the validity of this instrument should formally address the issue of the difference between mental retardation and developmental delay.

### STUDY 11f: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF RELEASE AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Esquith & Courte)

Purpose. This study replicated the use of a quantitative assessment procedure for the measurement of emerging release skills.

Subjects/Setting. Three severely handicapped children (ages 3, 4, & 6) and one normally developing infant (age 5 months) served as subjects. All the subjects were assessed in a preschool classroom.

Procedures/Data Collection. Percentage data were collected on the occurrence of grasp, approach, and release components. Procedures measured the fingers used, use of the right or left hand, the type of grasp, whether a palmar or fingertip grasp was used, position of the hand, whether the arm was supported or unsupported, whether release was into a container, and whether release was immediate.

Results. High reliability was obtained across subjects, positions, and stimulus items. Performance data supported the results of previous research in the following trends: 1) early hand preference, 2) specificity of grasp responses for the size of the stimulus items, and 3) developmental progression of release against a surface.

Discussion/Application. A major advantage of this assessment is its sensitivity to infrequently occurring behaviors and incremental change. This information will help the classroom teacher to meet the specific needs of the handicapped child.

Recommendations for further research. Additional research could further substantiate the reliability of this assessment. Longitudinal studies could yield data comparing handicapped and nonhandicapped children on their performance of release skills.

## STUDY 11g: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF TRANSFER AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Cisco & Esquith)

Purpose. This study replicated the use of a quantitative assessment procedure for the measurement of emerging transfer skills.

Subjects/Setting. Three severely handicapped children (ages 4, 4, & 5) and one normally developing infant (age 7 months) served as subjects. All of the subjects were assessed in a preschool classroom.

Procedures/Data Collection. Procedures measured the emergence and utility of the transfer response through the use of third surface, location in relation to the body, direction, percent occurrence and the effect of time.

Results. High reliability was obtained across subjects, positions and stimulus items. Performance data presented by subject reflected change in behavior over time, size of object and side of presentation.

Discussion/Application. This study contributes toward determining the effectiveness of this assessment for monitoring small changes in transfer skills in order to modify the intervention procedures.

Recommendations for further research. A larger number of subjects including those with visual and hearing impairments should be assessed as well as a larger group of normal subjects. Longitudinal research would be conducted in order to verify the developmental sequence of the skills and to demonstrate performance growth of subjects.

## STUDY 11h: A REPLICATION STUDY: QUANTITATIVE MEASUREMENT OF HEAD ERECT IN THE PRONE AND SUPPORTED SITTING POSITION IN NONHANDICAPPED INFANTS

(PIs: Rues)

Purpose. The initial procedures for measuring head erect were revised to allow for simultaneous measures of frequency and duration for two distinct but interrelated behaviors: head erect and weight bearing in the upper extremities. Additionally, the study was conducted to obtain an initial data base on the acquisition of head erect among nonhandicapped children.

Subjects/Setting. Two sets of identical twins and two single infants (all nonhandicapped), from ages 1 week to 24-36 weeks served as subjects. All infants were observed in their homes or in an occupational therapy department office.

Procedures/Data Collection. Head erect was measured in three positions: in prone, frequency and duration measures were taken for head lifts, head turns, and changes in arm positions; in prone with upper extremity weight bearing, the frequency and duration of selected arm positions were recorded; and in supported sitting, the duration of head erect was timed.

Results. High interobserver reliability was obtained across descriptors and across subjects. The simultaneous application of frequency and duration measures demonstrated several consistent trends in emergence and acquisition of head erect behaviors across subjects. Although the age of occurrence varied, the single infants consistently demonstrated several consistent trends in emergence and acquisition of head erect behaviors across subjects. Although the age of occurrence varied, the single infants consistently demonstrated an earlier age of emergence when combined to the pairs of twins. Generally, comparisons within and between sets of twins showed more concordance than comparisons of twins with single infants.

Discussion/Application. An analysis of the performance data suggests an interactive effect of stability and mobility patterns on covariations in emerging behaviors in prone position. Continuous longitudinal tracking, using quantitative procedures to assess motor development, provides information on similarities and differences in the sequence of motor development. An examination of these sequences allows for comparisons in rate of acquisition and covariations in emerging skills that had potential implications for the area of early identification and intervention.

Recommendations for further research. Longitudinal tracking of the acquisition of behaviors in the prone position will require that future research systematically address the differences in the various sensory/motor assessment procedures. Minimizing the differences will allow for ease in transition between tools and provide a basis for comparison of acquisition and covariations across behaviors.

## STUDY 11j: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF ROLLING AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Noonan & Fritzshall)

Purpose. The original rolling procedures were revised and replicated longitudinally to demonstrate the reliability of the rolling assessment. Due to difficulties in achieving reasonable reliability, the cueing procedures was changed, and the study was replicated a second time.

Subjects/Setting. The initial replication included one nonhandicapped infant (from 3 to 6 months of age) and three handicapped children (ages 3, 4, and 6 years). The second replication included a nonhandicapped infant (from 5 to 6 months of age) and two handicapped children (ages 4 and 6 years). The five handicapped children were observed in their school's occupational therapy room, and the nonhandicapped infants were assessed in their homes.

Procedures/Data Collection. Rolling was assessed from the initial positions of prone, supine, and sidelying, to both the right and left directions. A measurement of the degrees of body rotation, the body part leading the roll (frequency), and the amount of rolling were used to measure rolling. The procedures were streamlined from the original ones, and the body part leading the roll was an additional measurement.

Results. Mean reliability for subjects across sessions ranged from 82% to 89% for the initial replication. In the second replication, reliability ranged from 85% to 91%. The measurement of rotation was the most difficult on which to gain high reliability, although reliability did improve in the second replication. Performance results indicated that most rotation was between $11.25^{o}$ and $22.5^{o}$; most rolls were led by the shoulder, and the most frequent rolling mobility was one-quarter to one-half a roll per trial.

Discussion/Application. Since acceptable measures of reliability were obtained for each descriptor during the first or second replication, the procedures are recommended for obtaining data which could be valuable in the identification, treatment planning, and assessment of treatment techniques used with various handicapping conditions.

Recommendations for further research: The procedures outlined in the first or second replication are recommended for establishing norms and clarifying developmental trends in rolling behavior of handicapped and nonhandicapped children. These procedures are also recommended to establish relationships between descriptors and between an individual descriptor and other areas of development.

## STUDY 11m: A REPLICATION STUDY: QUANTITATIVE ASSESSMENT OF WALKING AMONG SEVERELY HANDICAPPED AND NONHANDICAPPED INFANTS AND CHILDREN

(PIs: Noonan & Foss)

Purpose. The original quantitative measurement procedures for walking were revised to simplify the needed equipment, refine the behavioral description of responses, and reduce the several time-based measures that occurred infrequently.

Subjects/Setting. Three handicapped preschoolers (ages 28, 29, and 30 months) and one nonhandicapped infant (9 months of age) served as subjects. The handicapped children were assessed in their special education preschool classroom, and the nonhandicapped infant was assessed in her home.

Procedures/Data Collection. Walking was assessed according to three categories of behavior: pulling to stand, standing, and walking. Pull to stand measures indicated the placement of hands, and leg and foot positions. Standing and cruising measures recorded the placement of hands, initial leg positions, the occurrence of bouncing and sidesteps, and standing duration. Walking measures included hand placement in relation to the child's own body, distance, duration, and stride length.

Results. Generally, this assessment proved to be reliable for observing walking behaviors of handicapped and nonhandicapped children. The lowest mean reliability for one child for all behaviors in pull to stand, standing and cruising, and walking, across all sessions, was 94%. The mean reliability for all children across all sessions was 99%.

Discussion/Application. Reliability was generally very good across behavior descriptors, sessions, and children. Typically, low reliability scores were between 0% and 50% and were for behaviors that occurred only once or twice. Performance results indicate that fluctuating responses of behavior descriptors may indicate behavioral improvements; higher level responses usually follow fluctuating responses. These procedures are promising for use in the classroom to monitor acquisition of and improvement in walking behaviors among handicapped children. Additionally, they may enhance the possibilities for early identification of handicapping conditions.

Recommendations for further research. Future research should include observation of the width or type of stance used in standing and walking. Additional longitudinal research using these procedures with both handicapped and nonhandicapped children is necessary to establish an accurate development sequence of walking skills.

### STUDY 12a(1): AN APPLICATION STUDY: VALIDATION OF QUANTITATIVE MEASUREMENT PROCEDURES TO ASSESS VISUAL FIXATION SKILLS IN HANDICAPPED AND NONHANDICAPPED INFANTS AND YOUNG CHILDREN

(PI: Janssen)

Purpose. The primary purpose of this study was to validate on nonhandicapped infants the quantitative procedures developed to assess visual fixation in handicapped children. A secondary purpose was to collect pilot data for future study of the relationships between specific infant visual, infant vocal, and mother behaviors.

Subjects/Setting. Four nonhandicapped infants (age 2-20 weeks) and their mothers served as subjects. Observations were made in the subjects' homes.

Procedures/Data Collection. Subjects were observed under each of two conditions; the visual fixation assessment and the mother/infant interaction. Observations were made every one to two weeks up to and including the infant's 20th week of age. Performance data for each subject under each condition were analyzed independently for relationships within, and comparatively for relationships between conditions, through the use of slopes and trend lines, rho correlations, conditional and unconditional probabilities, and non-parametric sign tests.

Results. The results indicated that the assessment procedures were a reliable and valid method of measuring visual fixation behavior. The assessment procedures successfully detected acquisition of visual fixation skills, were sensitive to emergence of visual fixation behavior, and reflected the infants' actual visual fixation skill level in the first four months of life. Furthermore, the data indicated that the interaction procedures were a reliable, efficient, and effective method of measuring mother/infant interaction behavior.

Discussion/Application. The quantifiable procedures should assist teachers of severely handicapped children in developing and monitoring effective educational programs in the area of visual fixation. The methodology for collecting interaction data should provide a useful tool to researchers for obtaining much needed data on handicapped or at-risk infants and their mothers.

Recommendations for further research. Further data is needed to demonstrate the effectiveness of the procedures for measuring acquisition of visual skills as a result of intervention, and to determine how the procedures can be integrated into a more comprehensive assessment package. Extensive study needs to be conducted with mothers and their handicapped or at-risk infants to try to determine what factors influence early visual skill development in handicapped infants, how visual skills relate to other infant and mother behaviors when the infant has a handicap, and what strategies are effective in enhancing visual skill development in these infants.

## STUDIES 12a(2) & 12j: AN APPLICATION STUDY: EVALUATING NEURODEVELOPMENTAL THEORY AND TRAINING WITH CEREBRAL PALSIED, SEVERELY HANDICAPPED STUDENTS

(PI: Noonan)

Purpose. The theoretical basis and effectiveness of Neurodevelopmental Training was investigated among cerebral palsied, severely handicapped students. Additionally, the application of quantitative measurement for head erect and rolling was evaluated in the course of this study.

Subjects/Setting. Seven cerebral palsied, severely handicapped children, ages 2½ to 12 years, served as subjects. They were observed in special education preschool and elementary school classrooms for severely handicapped students in the Lawrence and Kansas City area (five sites).

Procedures/Data Collection. Postural reactions of equilibrium and righting were trained across all seven subjects using a 4-step levels of assistance training strategy. The asymmetrical tonic neck reflex was probed every three sessions, and a normal motor pattern (either head erect or rolling) was probed every four sessions.

Experimental Design. Multiple baseline across two subjects was replicated three times. (One subject was not included in the multiple baseline.)

Results. Results indicated that training had a statistically significant effect for four children, and the visual analysis suggested a training effect in the data of two of these four children. Theoretical relationships among abnormal tonic reflexes and normal motor patterns were not supported by the data. A nonparametric analysis of variance test was significant for the group when the means for baseline and training were used to represent the data, but not when the slopes were used in the analysis.

Discussion/Application. It is concluded that postural reaction training may be effective for some children, but clearly not for all. Tonic reflexes do not appear to constrain the acquisition of postural reactions, and the acquisition of postural reactions does not appear to influence the development of head erect or rolling motor patterns--dependent relationships predicted by Neurodevelopmental Training. The use of quantitative measurement for the normal motor patterns seems to be very appropriate for monitoring slight changes in the head erect and rolling behaviors.

Recommendations for further research. It is recommended that future research include: 1) single subject designs using matched subjects to identify the subject characteristics related to the effectiveness of training; 2) investigation of sensitive measurement strategies independent of the training strategy; and use of this initial data base with a constructive or parametric approach to evaluating the Neurodevelopmental Training therapy package.

## STUDY 12h(1): AN APPLICATION STUDY: THE EFFECTS OF VESTIBULAR STIMULATION AND SOCIAL REINFORCEMENT ON SPEECH AND MOTOR BEHAVIORS IN MULTIPLY HANDICAPPED PRESCHOOLS

(PIs: Rues & Cook)

Purpose. Quantitative measurement procedures were used to investigate the effects of vestibular stimulation and social reinforcement on head erect and vocalization behaviors in multiply handicapped preschoolers.

Subjects/Setting. Three multiply handicapped preschoolers, ages 3½, 4, and 5 years served as subjects. Procedures were carried out in a large, well-lit, carpeted room located across the hall from the classroom the children attended.

Procedures/Data Collection. Measurement procedures consisted of recording the frequency of vocalizations, the frequency of head lifts, and cumulative duration of head erect in the prone position.

Experimental Design. A single subject reversal design, replicated three times, was used.

Results. Reliability across behavior descriptors and subjects was uniformly high. The alternating conditions produced differential effects across behaviors and subjects.

Discussion/Application. The study demonstrates that vestibular stimulation paired with social reinforcement produces a favorable effect upon head erect and vocalization behaviors for some subjects; however, social reinforcement alone produces similar responses for another subject.

Recommendations for further research. The various codes employed in the measurement of head erect and vocalization behaviors were limiting factors in the study. Future research addressing the frequency and/or duration of stimulation, immediacy of effects and generalization across motor programs is recommended to further define the parameters of this therapeutic intervention.

## STUDY 12h(2): AN APPLICATION STUDY: THE EFFECTS OF ANGULAR STIMULATION ON THE ACQUISITION OF HEAD CONTROL IN MULTIPLY HANDICAPPED CHILDREN

(PI: Dolaway)

Purpose. This study focused on the development of head control, using a combined approach of behavioral reinforcement (incorporated into the measurement procedure) and an intervention technique of semicircular canal stimulation.

Subjects/Setting. Four hypotonic multihandicapped children, ages 9 to 46 months, served as subjects. Two of the children were observed in a therapy room adjacent to their special education preschool classroom, one child was assessed at home, and one was assessed in a living room in the residential facility where he lived.

Procedures/Data Collection. The measurement procedure required that each child be placed in a prone wedge with the elbows in the weight-bearing position. The duration of each head lift was timed, and the average duration for five trials was recorded as the daily performance. The intervention procedure consisted of vestibular stimulation given in a series of six positions.

Experimental Design. A multiple baseline design across subjects was used.

Results. Observation of the mean durations and best fit lines indicated that two of the four children demonstrated ongoing improvement in head control after the introduction of the intervention technique.

Discussion/Application. Though the sample was limited, the results suggest that vestibular stimulation could be an effective auxillary technique in programming for head control in the prone position.

Recommendation for further research. Further research is needed to establish the efficacy of vestibular stimulation as an intervention technique for head control. It is recommended that quantitative measures be used to allow for sensitive measures of change.

## Summary and Conclusions

The first year of this project was primarily devoted to designing quantitative procedures to measure 14 sensory/motor areas. Specifications for developing the measurement procedures were derived for each area. These specifications included: description(s) of the behavior, conditions for observation, descriptions of the observations settings, needed material and equipment, data recording procedures, and the methods for collecting interobserver reliabilities. Years 2 and 3 were used to test the original quantitative measurement procedures with handicapped and nonhandicapped infants and young children.

During Years 3 and 4, a series of replication studies were conducted with the original assessment procedures. These replication studies were designed to measure child performance over a 10-week period in the attempt to assess interobserver reliability over a longer period of time and to measure the stability of child performance data using the quantitative measurement procedures. In addition, several studies have used the quantitative measurement procedures in applied intervention programs.

Research in Year 5 was devoted to completing replication studies for the areas of visual scanning, rolling, crawling, and creeping, and to conduct the three validation/application studies. In total, over 30 separate studies have been completed as part of the project. These studies have included approximately 160 handicapped and nonhandicapped infants and young children. Table 1 presents a timetable of research conducted in each sensory motor area.

## Major Findings

1) The collection of longitudinal data on handicapped and nonhandicapped infants and young children has provided a preliminary normative data base that assists in differentiating acquisition patterns in motor development between the two groups.

2) The procedures do not dictate a sequence of development, rather, the intent is to monitor emergence and acquisition in a handicapped and nonhandicapped population.

## Methodological Contributions

1) Quantitative assessment procedures have been developed for 14 critical sensory/motor skills (cf. ECI Document Nos. 254, 255, 257, 258, & 259). These skills were selected due to their obvious functional importance to the child's overall adaptive behavior.

The sensory/motor "developmental pinpoints" selected for measurements are listed following their major sensory/motor categories:

Visual Orientation: fixation, tracking and scanning (vertical and horizontal)
Fine Motor: reach, grasp, release and transfer (objects);
Gross Motor; Stability: head erect and sitting;
Gross Motor; Mobility: rolling, crawling and creeping

2) The procedures developed typically provide several different measures including: (a) frequency with which the child exhibits the behavior; (b) duration of each occurrence (when applicable); (c) conditions under which the skill can be competently utilized by the child (e.g., free operant and/or when specific efforts are made to elicit the skill); (d) degree or extent to which the child has the skill; (e) and, when a measure of range of motion or action movement is involved (e.g., crawling), the distance or range covered.

3) Reliability of the procedure has been demonstrated in both the initial studies and the longitudinal replications.

4) The procedures monitor the emergence and acquisition of basic sensory/motor skills and are sensitive to incremental changes in behavior.

## TABLE 1

Timetable for the Original Development, Replication, and Application of Quantitative Procedures to Measure Motor and Sensory Motor Acquisition Among Handicapped and Nonhandicapped Infants and Young Children

| | Project Years | | |
|---|---|---|---|
| Area | Original Procedures Tested | Replication Study Conducted | Application Study Conducted |
| Visual Orientation | | | |
| Fixation | 2,3 | 3,4 | 4,5 (two studies) |
| Tracking | 2,3 | 3,4 | 4,5 (two studies) |
| Scanning | 2,3 | 4,5 | 4,5 (two studies) |
| Fine Motor | | | |
| Reach | 2,3 | 4,5 | |
| Grasp | 2,3 | 3,4 | |
| Release | 2,3 | 4,5 | |
| Transfer | 2,3 | 3,4 | |
| Head Control | 2 | 3 | 3,4,5 (three studies) |
| Sitting | 2,3 | 4,5 | 4,5 |
| Mobility | | | |
| Rolling | 2,3 | 4,5 | 5 |
| Crawling | 2,3 | 5 | |
| Creeping | 2,3 | 5 | |
| Standing | 3,4 | 4 | |
| Walking | 3,4 | 4 | |

# CHAPTER II ECOLOGICAL GUIDES AND STRATEGIES FOR INTERVENTION

## Introduction

Ecology is the study of systems for the purpose of describing the interactions which occur among system components. The handicapped child is part of a dynamic ecosystem. The child is affected by the persons and events in a given setting, and, in turn, affects those persons and events. Description of the ecology that surrounds the handicapped child may be an important first step in assessing the child's skills and in formulating interventions that will facilitate the acquisition of additional skills. Since different settings may influence the degree to which the child exhibits competencies, assessment of skills requires a description of the setting in which the skills were measured. For example, in a classroom arranged to minimize disruptions and managed by teachers skilled in facilitating child-child interactions, a handicapped child may appear to be highly appropriate and socially adept. When there are few children readily available for cooperative play and teachers do not support cooperative interaction, the same child may appear isolate and disruptive.

Careful analysis of child environments may aid in determining what conditions or arrangements of the physical and social environment are related to the production of existing skills or the acquisition of new skills. Once relationships are determined, then critical variables can be manipulated to obtain appropriate child behavior. Classrooms with many teachers and mildly handicapped children are more likely to be successful settings for interventions requiring high levels of teacher attention than settings with few teachers and many severely handicapped students. Identification of variables that serve to make a setting more or less supportive to the handicapped child and the teaching staff is a first step toward providing guidelines for the design of more effective treatment.

Four classes of variables are important in the environment of the handicapped child:

1) The child's characteristics, including the child's age and handicapping condition, are considered as givens. In group settings, the characteristics of all the children present may be important.

2) The adult and the adult's behavior are important since adults typically control the setting. Classroom teachers and parents frequently determine the arrangement of the environment, select materials, apply contingencies, and generally structure the setting for the child.

3) The child's behavior and skills are considered separately from the child characteristics since the former are potentially modifiable by the environment. Patterns of behavior within group settings may also be important.

4) Setting events include the physical arrangement of the settings, the schedule of events, the specific materials used in teaching, and other nonpersonal aspects of the environment. Setting events may be quite general (room size, number of persons present) or very discrete (type size, workbook formats) but in either case the event is assumed to have some effect on the behavior of persons in the setting, particularly the handicapped child.

In general, each of these classes of variables has some influence on the others. Child characteristics, however, may influence the three remaining variables, but are unlikely to be changed by any of those variables. The child's characteristics may determine the potential range of behavior which the child may exhibit. Characteristics also appear to influence to some extent the behavior of teachers and parents. Setting events influence both adults and children, although not necessarily in the same manner.

A schematic representation of this interaction is shown in Figure 5.

The research in this chapter focuses on examining the ecology of the handicapped child in the home and in the classroom in order to make arrangements that are optimal for the acquisition of new behaviors by the child.

Two research goals focusing on ecology were designated:

Goal 1.2: To identify critical environmental variables which influence the learning and developmental status of the handicapped and at-risk child, and to monitor the child's performance under various environmental settings and parameters.

Goal 1.3: To develop intervention strategies from the findings of research on the identification of variables that affect the learning of handicapped or at-risk children.

The investigations have clustered around one central question: What are optimal arrangements in the home and classroom for handicapped children? There are four areas of research, corresponding with four types of ecological interaction:

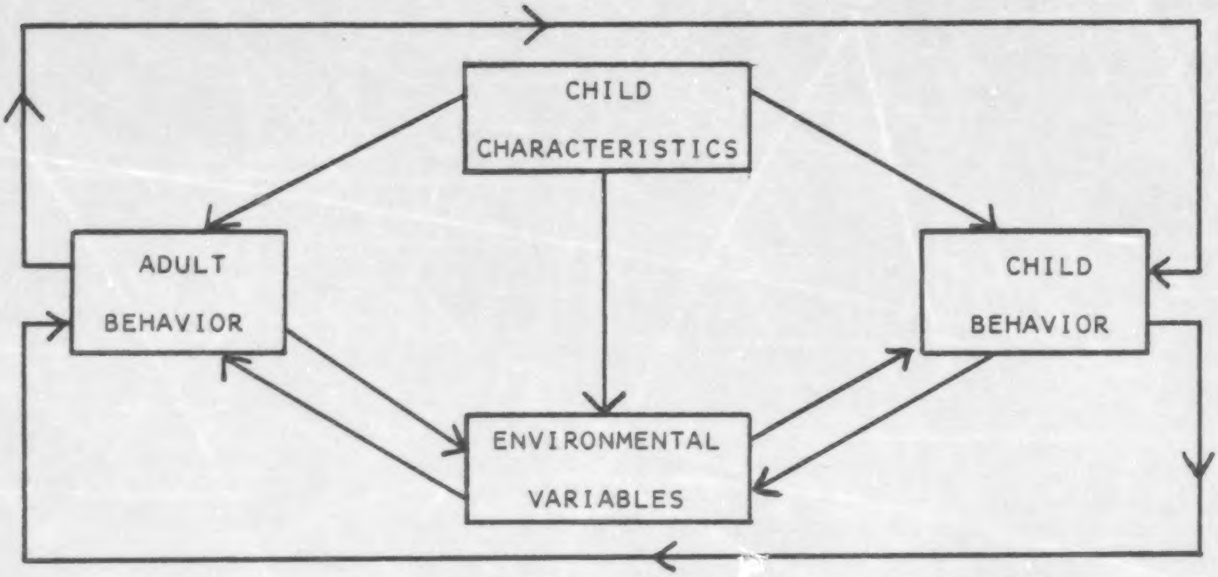
1) Child-Family. The social interaction skills and patterns in the interactions of the handicapped child in the home.

2) Child-Child. The social interaction skills and patterns in classrooms for handicapped and nonhandicapped children will be investigated and procedures for optimizing these interactions determined.

3) Child-Teacher. The teacher is an important person in the handicapped child's environment and this program of research will describe teacher interactions in order to formulate more effective facilitative teaching procedures.

4) Child-Setting. Setting events may be critical to the continued progress of the handicapped child. Research in this area will focus on setting variables that may be important to the success-

## THE HANDICAPPED CHILD'S ENVIRONMENT


CHILD
CHARACTERISTICS
ADULT
BEHAVIOR
CHILD
BEHAVIOR
ENVIRONMENTAL
VARIABLES

| | |
|---|---|
| CHILD CHARACTERISTICS: | Age, sex, handicapping condition--physical/ social variables that might be considered "givens" |
| ADULT BEHAVIOR: | Arranges setting, praises, corrects, prepares materials, interacts with child |
| CHILD BEHAVIOR: | Social behavior (plays alone, cooperates, aggresses), academic behavior (completes tasks, uses materials), linguistic behavior, motor behavior |
| ENVIRONMENTAL VARIABLES: | Room arrangement, materials present, numbers of teachers and children, schedule of activities |

FIGURE 5

ful transition of a child from a therapeutic to traditional classroom and on instructional material variables that may facilitate learning in preacademic contexts.

This section of research is integrally related to both the developmental and the assessment sections of the proposal. Investigations of mother-child interactions carried out as a part of the description of the infant's auditory environment (Chapter I) have formed the basis for continued monitoring of child-family interactions. The use of particular preacademic materials has been evaluated in conjunction with the learning assess-model (Chapter III).

Within the ecology section, a common research strategy has been employed by all investigators:

1) Describe existing relationships among ecological variables and child behavior.
2) Design and evaluate interventions based on descriptive information.
3) Integrate findings from descriptive and intervention studies.
4) Formulate prescriptive packages for use by other practitioners.
5) Test prescriptive packages in laboratory and field sites.

### 1) CHILD-FAMILY

Interactions among children and their parents are critical in shaping the children's social and intellectual development. For the handicapped or at-risk child, such interactions may contribute directly to the prognosis for the child's developmental status. The handicapping condition or developmental delays of the child may introduce new stresses that disrupt the dynamic interactions of families. Thus, the nurturing and teaching functions typically fulfilled by the family may be disrupted and the child's development further affected by this disruption.

In this section, two research projects involving parent-child interactions are described. The first project has examined the families of handicapped and at-risk children for evidence of dysfunction and evaluates intervention strategies to increase appropriate interactions among parents and children. The second project has focused on the linguistic teaching interactions of mothers and their language-learning children in order to identify mothers' teaching strategies and childrens' learning strategies that influence language acquisition.

## ECOLOGICAL GUIDES TO INTERVENTION

### QUESTION A: WHAT ARE THE CHILD-FAMILY SETTING AND SOCIAL PROCESSES ASSOCIATED WITH THE ETIOLOGY AND REMEDIATION OF FAMILY DYSFUNCTION FOR CHILDREN AT-RISK FOR DEVELOPMENTAL DELAY?

(Investigator: L. Embry)

### Statement of the Research Problem

A family relationship is the result of a complex interaction of personal history of the parents, perceptions of family members, physical or time constraints of the home and work patterns, demographic factors, and most significantly, the interaction patterns between parents and children. Fortunately, the interaction patterns that contribute the greatest extent to the family relationship are also the most susceptible to intervention. Although much is known about the interplay of these factors (e.g., Walberg & Marjoribanks, 1973) much less is known about the actual interactions of at-risk families. Accordingly, little information about remediation of family dysfunction in families of at-risk or handicapped children has been obtained.

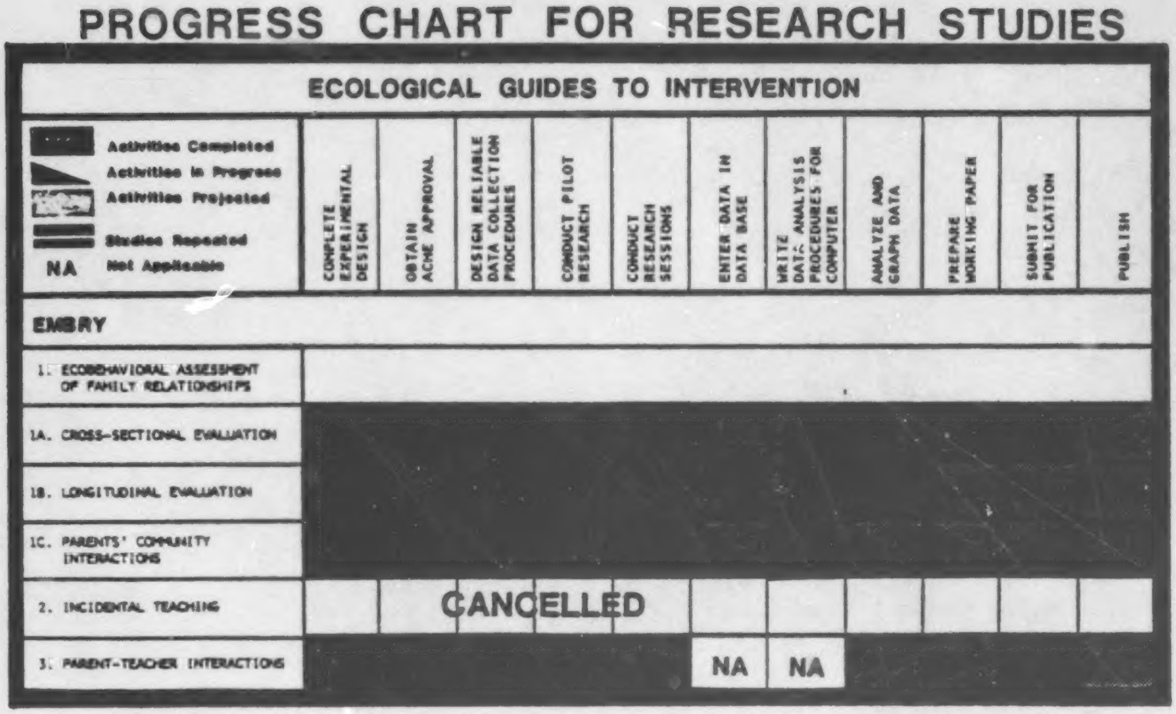
### Assessment of At-Risk Preschool-Aged Children and Their Families

In past research, a great deal of data on sociological, psychological, and personality variables of the family with a child at-risk for developmental delay have been obtained. As a result, it is fairly clear what the "typical" characteristics are for the at-risk parent and child. For instance, it is known that the "typical" parent is often socially isolated with minimal support systems, has difficulty coping with crises, has a poor self-image, perceives the child as "different" or has a distorted perception of the child, is of low-socioeconomic and educational levels, moves frequently, and has several children. The "typical" at-risk child was premature, had a low birth weight or had early separation from the parent, has a language delay or other developmental disabilities, has a poor self-image, and exhibits behavior problems (Gil, 1970; Martin, 1975; Farber & Ryckman, 1965; Elardo, Bradley, & Caldwell, 1975; MacKeith, 1973; Ramey, Mills, Campbell, & O'Brien, 1975).

In this report, a discrimination is made between the measurement of descriptive characteristics versus prescriptive characteristics of the family unit. The preceding lists of descriptive characteristics provide valuable information about the family history but much less information upon which to develop successful intervention strategies to improve family relationships. The next step was to develop assessment strategies for individual families that not only prescribe intervention procedures tailored to the specific needs of a given family but also yield relevant data on the commonalities in development of the parent-child relationship across families.

### Ecobehavior Assessment

A behavioral approach to assessment provides valuable descriptive information about both the topography and rate of behavior patterns (e.g., frequent negative parental commands), as well as prescriptive information



## PROGRESS CHART FOR RESEARCH STUDIES

### ECOLOGICAL GUIDES TO INTERVENTION

■ Activities Completed
◣ Activities in Progress
▨ Activities Projected
═ Studies Repeated
NA Not Applicable

| | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **EMBRY** | | | | | | | | | | | |
| 1. ECOBEHAVIORAL ASSESSMENT OF FAMILY RELATIONSHIPS | | | | | | | | | | | |
| 1A. CROSS-SECTIONAL EVALUATION | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1B. LONGITUDINAL EVALUATION | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 1C. PARENTS' COMMUNITY INTERACTIONS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 2. INCIDENTAL TEACHING | | CANCELLED | | | | | | | | | |
| 3. PARENT-TEACHER INTERACTIONS | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | ■ |

FIGURE 6

79

about dysfunctional relationships in parent-child interactions (e.g., low rates of parent attention to appropriate child behaviors). This identification of specific dysfunctional relationships has direct implications for behavioral interventions that might remediate those behavior patterns. However, behavioral assessment typically examines only the contingent relationships that circumscribe a particular setting. An ecobehavioral approach expands the analysis to include ecological variables, such that the behavioral relationships are evaluated from a contextual perspective. That is, the relationships between individuals are a function of the intersections of physical characteristics of the setting, the contingent relationships, and the expectations of purposes of the members of that setting. Thus, the ecobehavioral assessment of a particular family involves the identification of target behaviors of particular family members, the physical settings that facilitate or interfere with the target behaviors, the contingent relationships between the target behaviors of individuals, and perceptions by family members of the desirability of those behavior patterns.

The assessment of each family identifies specific response relationships between, or among, family members that contribute to family dysfunction, such as: low rates of attention for appropriate child behaviors, high rates of negative comments by the child, or parental demand for age-inappropriate behaviors. The assessment also identifies environmental factors that interfere with or facilitate appropriate behaviors including scheduling conflicts such that no adult was present during chore-completion time or inaccessible physical placement of toys following a request for the child to play independently. Additionally, the consequences for the target behaviors are identified, such as ignoring the child's social initiations or the infant's vocalizations that would be expected to produce parental imitation or verbalization. The parents' satisfaction or dissatisfaction with present interaction patterns and their willingness to make changes to facilitate learning new response patterns are identified also.

This prescriptive analysis of each family's dysfunction provided the basis for the assessment of the impact of a handicapped child on the family, the development of individually tailored treatment plans, the commonalities of effects and needs across families, and a systematic evaluation of treatment effectiveness both within and across families.

The objective of this research was to examine patterns of parent-child interaction by taking an ecobehavioral perspective that included analysis of historical, physical, and contingency factors that impede or enhance successful family relationships of normal, handicapped, and at-risk children. Additional information regarding patterns of interaction not only facilitated treatment of family dysfunction but also contributed to better prescriptions.

This research project was designed: (a) to identify the characteristics of both the nurturant and dysfunctioning home environments of young, at-risk, and handicapped children, and (b) to explore and develop some ecological strategies to increase both the frequency and effectiveness of parent-teacher contacts.

## General Methods

### Data Collection Procedures and Analysis

In order to determine if a family is engaging in interaction patterns that comprise a positive, healthy family relationship, OBSERVATION OF THE FAMILY'S INTERACTION IN THE HOME ENVIRONMENT IS NECESSARY. If the data suggested that the family is functioning well, information on those stimulus conditions and types of interaction patterns that facilitate healthy relationships was obtained. If the data suggested that a family was experiencing disruption in parent-child interactions, information on those stimulus conditions and types of interaction patterns that impede family harmony was obtained. Such an analysis simultaneously pinpoints behavior patterns appropriate for intervention and determines the effectiveness of the intervention in improving the family relationship.

Two types of data were collected:

1) Information obtained through questionnaires and interviews include a complete family history, perceptions about family relationships, the impact of the handicapped child on the family, methods of discipline, and family demographic factors.

2) The direct observation of parent-child interactions provides information on the contingent relationships in parent-child interaction; the types, frequency, and intensity of various interaction patterns; and the physical characteristics of the settings in which the interactions took place.

### Experimental Design

Two primary evaluation strategies were used in the description, identification, and possible intervention within developing parent-child relationships. The first strategy involved the longitudinal tracking of samples of families selected randomly from the Lawrence population of infants assessed during the first year of life by Horowitz and her colleagues. These families were observed quarterly for 2 years or until the child was 3 years of age. The normative data obtained by tracking these families permitted comprehensive and comparative analyses of the long-term development of parent-child interactions in families with normal, at-risk, and handicapped children. In this way, it was possible to construct and analyze correlational matrices of repeated measures on a number of marker variables tracked both by the Parent Program and investigators in infant and language research. The observation systems used by these research groups were designed to complement each other and to provide additional data to be shared among investigators.

The second evaluation strategy may be characterized as cross-sectional, but it was also intervention-oriented. As families participated in various experimental service programs offered by the Parent Program, they were observed as frequently as the design of the various projects required, usually weekly. These observations provided data on both those marker variables of family interaction that were to be examined in the longitudinal sample and on additional dimensions that were the targets of particular intervention programs in which the families participated. In fact, following participation in the longitudinal research, there was considerable crossover into the cross-sectional, intervention-oriented program. Twenty-five percent of the longitudinal families experiencing parent-child interaction difficulties requested and received assistance in remediating those problems. Thus, the observational data obtained on each family, at least through baseline periods, was available to contribute to the descriptive data base on children and their families developed by the Institute.

## STUDY 1: ECOBEHAVIORAL CHARACTERISTICS OF NURTURANT AND DYSFUNCTIONING HOME ENVIRONMENTS OF YOUNG AT-RISK AND HANDICAPPED CHILDREN

(PI: L. Embry)

Purpose. Previous research (e.g., Elardo et al., 1975) has shown that the home environment is a critical determinant of childrens' intellectual functioning. However, most research in this area is descriptive and global in nature and provides little prescriptive information upon which remediation strategies may be based. It was the purpose of this research to evaluate the ecobehavioral process of family interaction in order to delineate those interactions and/or settings which contribute to dysfunctional parent-child relationships.

The following sections describe the data collection procedures and data analyses used in Studies 1a, 1b, and 1c:

### Data Collection Procedures.

Family History and Attitudes. Each family completed the questionnaire and was interviewed by an experienced staff member familiar with the parents' responses on the questionnaires. The questionnaires served as a guide to structure the interview in order to obtain additional information for the family or staff member. This interview also provided the opportunity for parents to find out about the program and services offered to parents with a child enrolled in one of the site's classrooms.

Behavioral Observation of Parent-Child Interactions. Direct observation of parent-child interactions was conducted in the families' homes at a time convenient to the parents. Each observation lasted approximately 1 hour. Data were taken on parent-child interactions in two settings with varying demand characteristics. The first was a setting in which the child's compliance and the parents' instructional control were evaluated (L. Embry, 1980). An array (10-20) of easily nameable toys was located near the parent and a specific number of containers (1-4) were arranged several feet from the parent. The parent instructed the child to take each toy and place it in the proper container. The Instructional Control observation yielded information on how responsive the child was to parental requests, what techniques the parent used to get the child to comply, and the parent's responsiveness to the child.

The second observation was taken in a Routine Times setting (L. Embry, 1980) in which the parent was instructed to engage in whatever activities might normally be pursued at that time, although the television was not to be turned on and the parent was to remain proximal (same or nearby room) and accessible to the child.

Data on the parent-child interactions in this less-structured setting included: rates of parent attention to appropriate and inappropriate child behaviors, the parent's use of descriptive positive feedback, and the child's compliance and rates of appropriate and inappropriate or deviant behaviors.

All data obtained through direct observation were collected and coded using the 10-second continuous time sampling method of recording. Two trained observers, equipped with clipboard, attached stopwatch, and special coding sheets took the data, categorizing the types and flow of parent-child interactions taking place. Reliability estimates of inter-observer agreement were obtained by comparing the observers' simultaneous observation records.

Data Analyses. The interactive influences of contingency relationships and setting characteristics that affect the content, frequency, intensity, and duration of parent-child interactions were established through the ecobehavioral analysis. Assessment of the stimulus conditions that characterized successful versus disruptive parent-child interactions provided prescriptive analyses of the individual family's interactions across several settings, as well as a comparative base to assess commonalities of parent-child dysfunction across families.

Data from the questionnaires and interviews about family history and attitudes and the direct observational records of parent-child interaction were analyzed and integrated into composite data records.

1) Data obtained from the questionnaires and interview were organized into a format suitable for analysis through the computerized integrated-data system of the Early Childhood Institute. Specific analyses of particular response categories or constellations of responses were conducted to develop profiles of the families with a handicapped child who were experiencing family dysfunction, who were at-risk for family dysfunction, and who were making a healthy adjustment with the development of a positive, supportive family relationship.

2) The observational records of parent-child interactions also were analyzed to yield individual and normative data on the interaction patterns of families that were identified as either at-risk for or actually experiencing family dysfunction.

Development and Evaluation of a Taxonomic Key to Profile the At-Risk Family. As each family's ecobehavioral assessment was completed and analyzed, their data were added to the development of a taxonomic key specifying the parameters of family history and interaction patterns that place a family at-risk for dysfunction and developmental delay.

As each family's data were added to the preliminary organizational structure, internal support for the prediction of dysfunction or risk has gradually accumulated. This method of analysis is cumulative and thereby provided an ongoing, but simple, monitoring of numerous variables that may be significant in the development of family dysfunction. As findings begin to cluster, an emerging profile of family dysfunction is produced that results in the generation of data-based hypotheses on the nature and treatment of family dysfunction and developmental delay.

## STUDY 1a: A CROSS-SECTIONAL EVALUATION OF ECOBEHAVIORAL CHARACTERISTICS
(PI: L. Embry)

Subjects/Setting. Seventy-six parent-child dyads with children ranging in age from 2 to 7 years of age were the subjects for the cross-sectional sample of families. Approximately one-half of the children were handicapped or at-risk for handicapping conditions. Twenty-three (33%) of the children were handicapped and twelve (16%) were at-risk.

Families' socioeconomic levels ranged from low income with little education to upper income with high educational achievement. The majority of families were low income. Families were referred from a wide variety of community agencies including (in order of frequency): friends, preschools and day care centers, the public health department, Child Protective Services, and pediatricians.

Each dyad was observed weekly in the home, in two settings. The first setting, Instructional Training, was a high-demand setting in which the parent was instructed to have the child put away a series of easily-nameable toys in two to four containers, depending on the child's developmental level. The second setting, Routine Times, was a much less-structured observation period in which families were instructed to engage in their normal routine but to stay proximal to their children.

Homechecks were scheduled at the parents' convenience and at times when they reported difficulty managing their children's behavior. Thus, approximately two-thirds of all homechecks took place from 3 to 9 p.m. or on weekends. The number of homechecks for each family ranged from 12 to 45 because of variations in individual acquisition of the interaction skills taught. All dyads have completed the baseline and intervention phases.

Data Collection. Data were taken on parental instructions, parental attention to positive and negative child behaviors, parental use of limit-setting techniques, child compliance and noncompliance, and child verbal positives and aggression.

All parents also completed questionnaires and interviews on the family history and structure, the family's community contacts, the child's birth and medical history, the child's developmental progress, and ratings of the parent-child relationship and of the marital relationship.

Experimental Procedures. Baseline data were collected over a period of two to four weeks for each dyad. When a stable pattern of interactions was observed, home-based training and feedback were initiated. Parents were taught behavior-building skills such as descriptive feedback, shaping, and differential attention; they were also taught limit-setting skills such as time out, physical guidance, and response cost procedures. Training in specific skills was individualized for each family.

Training procedures included: modelling, behavior rehearsal, instructional and graphical feedback, and self-recording of selected target behaviors by the parents. Training was conducted in the home prior to, during, and following the observations of parent-child interactions in the Instructional Training and Routine Times settings.

Results. Eight groups of 8 to 10 parent-child dyads have completed training. The findings indicate that prior to home training, parents responded more frequently and negatively to their children's inappropriate and noncompliant behaviors and less frequently and neutrally to their children's appropriate and compliant behaviors. Following training in differential attention and time out, parents responded more frequently and positively to their children's compliant behaviors. This resulted in significant improvements in the children's compliance with parental requests and overall pleasant, appropriate behaviors.

Discussion. Information collected on these families' interfamily and community interactions was entered into the computer for analysis. Other comparative analyses will be completed when the questionnaire data on family history, child developmental progress, child medical and birth history, and parental attitude data on the referred child have been entered into the Early Childhood Institute data base.

## STUDY 1b: A LONGITUDINAL EVALUATION OF ECOBEHAVIORAL CHARACTERISTICS (PI: L. Embry)

Subjects/Setting. Fourteen families were selected and completed the initial interviews and the questionnaire phase. Seven of these families were labelled at-risk as a result of a composite score of risk factors including prenatal, perinatal, and parents' own child-rearing experience factors. Seven of the families were labelled normal from the absence of these factors. Two families were dropped from the research because the control-match family of one pair declined to participate after the interview and first observation were completed. Thus, twelve families' data were available for analysis.

Home observations were begun and continued through Year 5. These observations were scheduled so that three home observations within a 2-week period every 3 months were completed.

Data Collection. The procedures for the collection of the questionnaire and observational data have been described in the General Methods section.

Results. The first cohort of families has been observed for approximately two years. These children are now 3 years of age. The second cohort has been observed one year. Plans for the acquisition of a third cohort were dropped because of restricted funding. Each family's questionnaire and observational data were entered into the ECI data base for analysis.

Although these data are currently only available for individual analysis via graphical inspection, some preliminary findings appear notable across families. That is, some trends in the data suggest certain commonalities across parent-child interaction patterns. Both normal and at-risk families have little verbal instructional control of their young children (18 months to 27 months of age); however, within the second year, parents' strategies for managing and teaching their children appear to undergo some fairly radical changes. These changes in parental behavior appear to be related to subsequent changes in their children's cooperation. Parents reduce the frequency of their interactions with their children from almost constant initiation and description of their children's behavior, and instead spend more time simply observing their children's behavior and requiring the children's participation in more routine household activities. The use of verbal limit-setting also increases as physical rearrangement of the environment and removal decreases. Parental use of very clear instructions paired with praise for the child's responsiveness and immediate limit-setting for noncompliance describe families in which the child comes under instructional control of the parent. Parents who continue to use a constant rate of initiation and description, primarily of a neutral nature, with few clear instructions or the use of limit-setting techniques, have children at three years of age who are no more cooperative than they were at 18 months of age.

Discussion. These data suggest that there are specific parent-child interaction patterns that exhibit themselves in the child's third year of life that may well be predictive of later family dysfunction. At 18 months of age, children and their mothers have similar interaction patterns, regardless of previous history which may place these children at-risk for developmental delays or disabilities. However, how parents and children handle the transition from physical care and interaction to social responsiveness and care in the child's third year appears to be crucial in determining later developmental success.

Unfortunately, understanding this process is complicated by two factors. The first is the complexity of describing a changing interaction pattern; the process itself may be the crucial dependent variable. The second factor inhibiting such research is the lack of any body of data describing the normative development of parent-child interactions during the third year of life by which deviations in such patterns may be compared and examined. Continued work in this area, through longitudinal and cross-sectional evaluations of parent-child interactions, should reveal more information about this crucial period of family development.

## STUDY 1c: A COMPARISON OF NORMAL, HANDICAPPED, AND/OR ABUSING PARENTS' COMMUNITY INTERACTIONS

(PI: L. Embry)

Purpose. Both parents of handicapped children and parents that abuse their children have been described as socially isolated (e.g., McAllister, Butler, & Lei, 1973; Helfer & Kempe, 1976). Additionally, it appears that treatment outcome of child-management training may be affected by the level of isolation experienced by the family (Wahler, 1979). Thus, treatment strategies for families with handicapped children or families at-risk for abuse should probably include a component to reduce the level of social isolation experienced by these families.

This study examined the community contacts of normal, abusing, and handicapped families participating in a group parent training program.

Subjects/Setting/Procedures. Twenty-eight families (13 normal, 15 handicapped/abused) reported the types, frequency, location, duration, and pleasantness of their interactions with individuals or agencies outside of their immediate family members for each 24-hour period preceding the weekly training home visit during their participation in a group parent training program. A form called the Community Interaction Checklist was filled out by the parent and therapist.

Results. Analyses of community interactions of the families in our sample indicated that families who abuse their children are similar to the families in Wahler's (1979) sample that failed to maintain the child management skills they had been taught. However, the initial analyses of normal and handicapped children's families indicate relatively few differences.

Families who abuse their children have many fewer interactions than families of normal or handicapped children, which have similar numbers of interactions per day (Embry, Buchman, Isaacs, Martin, & Rogers-Warren, 1979). The types of interactions that families who abuse their children have also differ from those of normal or handicapped children's families. Abusing families have interactions primarily with relatives or kinfolk which are rated less positively than the interactions of nonabusing families. Consequently, abusing families have many fewer interactions with friends; but all families have approximately equal proportions of interactions with helping agencies. The ratings of abusing families and families with handicapped children are the only characteristics in which there are similarities. Both families of handicapped children and abused children rate their interactions lower than nonabusing families of nonhandicapped children.

Correlational analyses of families' parent-child and community interaction data indicate that a strong relationship exists between the two for socially isolated, abusive families; a moderate relationship exists in families with handicapped children; and no relationship exists in families of normal children. Thus, the more negative a parent rates community interactions, the more likely the parent and child will interact in a highly negative fashion on a given day, if the family has other serious problems with which to cope such as a handicapped child or an already negative, abusive interaction pattern.

Discussion. These data support the notion that families' interaction patterns with children, spouses, and the community become increasingly interrelated as the severity of family dysfunction increases. Thus, the multi-problem family becomes enmeshed in a series of interaction patterns that only compound their difficulties.

It seems likely that unitary interventions that limit their scope of impact to one level or area of family or child functioning will have extremely limited effects. Thus, an ecobehavioral analysis of child and family functioning prior to intervening would be crucial to the development of interventions that can be integrated, generalized, and maintained successfully by the child and family.

## STUDY 2: CAN AND WILL PARENTS USE AN INCIDENTAL TEACHING STRATEGY IN THE HOME DURING NORMAL ACTIVITIES?

(PI: L. Embry)

This study was projected for Years 4 and 5, but lack of funding and personnel has made it impossible to carry out.

## STUDY 3: PARENT-TEACHER INTERACTIONS AS A FUNCTION OF TEACHER PROXIMITY

(PI: L. Embry)

Purpose. Although there are numerous books and manuals available to parents on teaching the handicapped child, there are few materials on developing and conducting parent-involvement programs available to service providers working with handicapped children and their families. It was the purpose of this study to examine a strategy to increase teacher-parent contacts by having the teacher greet and conduct the child health checks each day by placing the teacher outside of the classroom. It was hoped that the frequency of parent-teacher contacts would increase because of increased opportunity to interact when the teacher conducted the health check outside of the classroom.

Subjects/Setting. The teachers and parents of children enrolled in four child care programs were the subjects. The four classrooms represented a range of child care programs from a preschool for the severely, multiply handicapped to a day care center for normal children.

The child care programs were: 1) a half-day preschool program for the severely, multiply handicapped located at the KU Medical Center in urban Kansas City; 2) a half-day preschool program for moderately and mildly, language-delayed children located in a large, old house in the

Lawrence community; 3) a half-day preschool program for mildly handicapped, at-risk, and normal children located in a university building; and 4) a full day care program for normal preschool-aged children also located in a university building. The average number of parents bringing their children each day varied across the classrooms from 6 at the SMH preschool to 12 at the day care center.

Data Collection. The frequency, duration, and content of each teacher-parent interaction during the morning arrival period were measured each day by two unobtrusive observers located near the classroom entrance.

Experimental Design. A reversal design was employed to evaluate the effects of alternating conditions of Teacher-In-Classroom and Teacher-Out-of-Classroom on the parent-teacher interactions quantity and quality.

Experimental Procedures. Two ecological arrangements of teacher proximity were examined. Teacher location inside the classroom itself and teacher location outside the classroom in hallway areas immediately outside the classroom entrance doors were the two experimental conditions varied. Teachers were never informed of the experimental hypothesis nor were they informed of condition changes until the day before the condition change was to take place. Additionally, no condition changes were made within one week of school starting or ending.

Results. The data in Figure 7 indicate that during conditions of high teacher proximity (Teacher Outside Classroom), parents and teachers interact more frequently. During conditions of low teacher proximity (Teacher Inside Classroom), parents and teachers interact less frequently. These effects were found consistently across all types of classrooms and held true whether parents and teachers began the study with greater experience in either condition.

Not only did the number of interactions change, but also the number of parents interacting with the teacher changed as a function of the ecological arrangement. More parents, in fact, nearly all parents, interacted with the teacher when the teacher was located outside the classroom in greater proximity. However, during low teacher proximity, approximately one-half of the parents interacted with the teacher. Thus, not only is there more interaction but more parents became involved.

Discussion. These findings suggest that through simple ecological rearrangements, parent involvement can be enhanced. When parents and teachers can develop informal and frequent methods of communication, more structured, formal communications such as an IEP meeting may go more smoothly. Both parents and teachers will know one another better and have developed a relaxed and comfortable interaction pattern.

Future research should extend these findings in such a way that measures of parent and teacher comfort and communication ratings are obtained. It would be interesting to explore whether families in which the parent interacts frequently and positively with the teacher on a daily basis rate home-school communication more positively and participate more actively in school programs and IEP meetings.

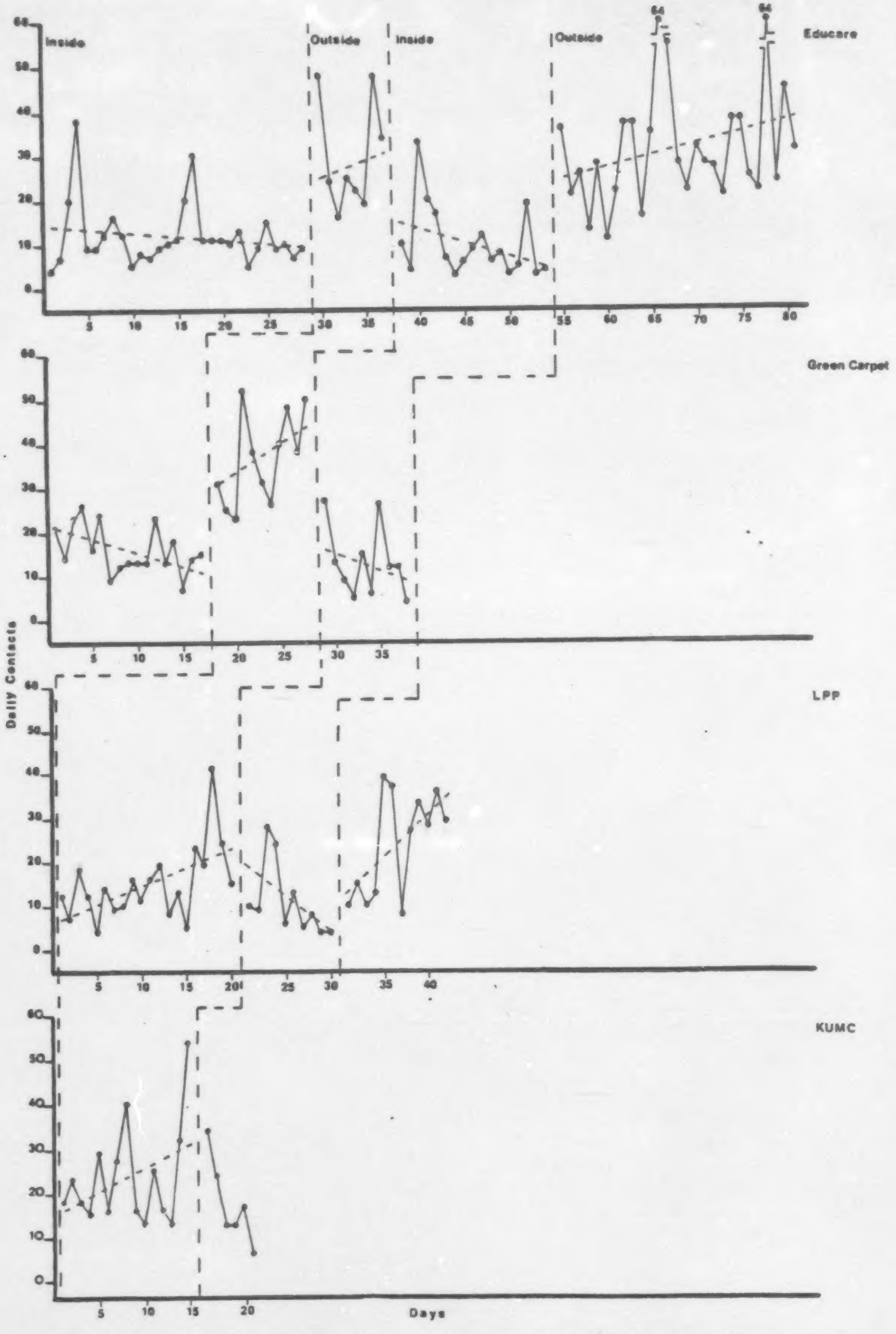


Figure 7. Experimental analysis of parent-teacher interactions.

## Overview of Research

Research efforts by L. Embry and her colleagues on parent-child interactions have focused on the development of reliable assessment devices and coding procedures (cf. Embry, ECI Document No. 506); the training of observers to collect data; the completion of parent training and data collection on a sample of families in the cross-sectional research; the recruitment and observation of the first and second cohorts of families involved in the longitudinal research; and the experimental evaluation of an ecological intervention to facilitate parent-teacher communication.

Questionnaires were developed, pretested, put into use with families, and distributed among Institute investigators. They provide information on family structure, demographic and community interactions, parental attitudes about the child and the pregnancy and the child's birth, medical, and developmental history. Additionally, a manual has been prepared describing the observation, coding, and data analysis of parent-child interactions. An accompanying manual trains individuals to carry out the diagnostic assessment process, utilizing the coding of parent-child interactions in the home and a battery of assessment instruments.

Coding and data analysis have been completed for family interactions within compliance and routine time settings in the home for 76 parent-child dyads in the cross-sectional research and 12 parent-child dyads in the longitudinal research. Results from the cross-sectional research indicate that parents of normal and handicapped children, prior to home training, respond more frequently and negatively to their children's inappropriate and noncompliant behavior and less frequently and neutrally to their children's compliant and appropriate behaviors. Following training in differential attention and time out, parents respond more frequently and positively to their child's appropriate behaviors and decrease their negative interactions with the children. This results in significant improvements in the children's compliance with parental requests and overall pleasant, appropriate behaviors. The acquisition time of these new interaction patterns for the parents and children varies considerably and appears to be a function of the child's developmental level and the severity of the parent-child problems. That is, handicapped children, younger children (3½ years of age and younger), and abusive parents require longer periods of these new interaction patterns in use before improvements in the children's behavior result.

The longitudinal evaluation of family development for normal and at-risk children has revealed that family interactions undergo radical changes when children are between 2 and 3 years of age. These data suggest that the process of change during this transition year may be related to the facilitation or inhibition of supportive home learning environments for the preschool-aged child at-risk for developmental delay. These data provide a limited normative data base for the analysis, comparison, and remediation of dysfunctional family interactions and also yield a predictive data base for the early recognition and treatment of inadequate parenting skills for the at-risk toddler and preschooler.

The description and comparison of families' community interaction patterns has provided information about the role these interactions play in formation of facilitative social networks for abusive, handicapped, and normal families (see Table 2 for the Community Interaction Checklist Data Analysis form used). Families experiencing the most severe disruptions in parent-child interactions had the fewest and most homogeneous community interactions, primarily interactions with relatives. Families of handicapped and normal children (nonabusive) had similar rates of interactions, and interactions were more frequently with friends, businesses, and helping agencies. Neverhtheless, neither abusive nor handicapped families rated their community interactions as positively as normal families. Thus, dysfunctional parent-child interactions were similar to these distressed families' community interactions, few in number and frequently negative.

## TABLE 2

## Community Interaction Checklist Data Analyses

By Group Type:

Handicapped/Nonhandicapped (Abusing/Nonabusing)
Abusing/Nonabusing (Handicapped/Nonhandicapped)
Individual/Group Treatment
Single/Two-Parent Families
Income Levels
Mothers/Fathers
Mother Working/Mother Not Working

Variables To Be Examined

Number of interactions

Distributions/proportions of interactions by type

-friend
-relative (HS or WS)
-helping agencies (including/excluding Parent Program contacts)
-husband or live-in boyfriend
-miscellaneous
-work

Ratings of interactions by types & overall

Proportions of self-initiated to other-initiated interactions

Ratings by self/other initiations

Number & proportions of Self, Both, Other, Nobody, & Unclear descriptions of who benefitted

Overall and by types

Total time, mean, & modal measures of duration or length of interactions

Proportion of in-person and by-phone interactions

Proportion of in-home/out-of-home interactions and ratings thereof

Number & proportions of nature of interactions
social, visit
child-related
outside activity
helping agency
all others combined

Number, mean, and modal ratings of days

With/without unusual circumstances

Mean & modal ratings of Parent Program contacts/homechecks

## ECOLOGICAL GUIDES TO INTERVENTION

## QUESTION B: WHAT STRATEGIES DO MOTHERS OF HANDICAPPED, AT-RISK, AND NORMAL CHILDREN USE TO TEACH LANGUAGE?

(PI: Rogers-Warren)

Of all the behaviors the handicapped child must acquire in order to function in the classroom and home, language is the most critical. Language is essential to nearly all of the child's endeavors: It must be understood and it must be produced in order for the child to manage the environment. The importance of language is well recognized by teachers, and classroom curricula and special services frequently are directed toward teaching necessary language skills. However, the most important language teaching is probably that which occurs naturally in the home. Regardless of the adequacy of the curricula or the quality of the remedial program the child attends, the handicapped preschooler will spend much more time in the family domain, interacting with parents and siblings. For the normally developing child, such interactions are sufficient to allow language acquisition to occur with relative ease; even handicapped children requiring specific language training will learn some language from naturally occurring linguistic interactions.

For the handicapped or at-risk child, the teaching function that occurs in mother-child interactions is particularly critical. The handicapped child may have physical or cognitive deficits that interfere with the normal processing of language stimuli in the natural milieu of conversation and daily events. Specific linguistic interaction guided toward eliciting language from the child or teaching a particular linguistic concept may be necessary for the acquisition of most language skills. However, very little is known about mothers' teaching of language to their handicapped children. The current research investigates the parameters of mother-child interaction that relate to mothers' teaching of language and linguistic concepts to their handicapped children.

The ultimate goal of this program of research is the formulation of procedures to aid parents in facilitating their handicapped child's language development. However, this research is primarily descriptive. Three basic research questions were posited:

1. HOW DO THE VERBAL INTERACTIONS OF PARENTS WITH NORMAL, AT-RISK, AND HANDICAPPED CHILDREN DIFFER?

2. HOW DO PATTERNS OF PARENT-CHILD VERBAL INTERACTION CHANGE AS THE CHILD MATURES (IN ALL THREE POPULATIONS)?

3. WHAT EFFECT DO DIFFERENCES IN PARENT-CHILD VERBAL INTERACTIONS HAVE ON THE CHILD'S ACQUISITION OF LANGUAGE (IN ALL THREE POPULATIONS)?

### STUDY 4a: DESCRIBING THE LINGUISTIC INTERACTIONS OF MOTHERS AND THEIR LANGUAGE-LEARNING CHILDREN: A PILOT STUDY

(PI: Rogers-Warren)

Purpose. The purpose of this study was to test the data collection, coding, and analysis procedures to determine if the variables selected

## PROGRESS CHART FOR RESEARCH STUDIES

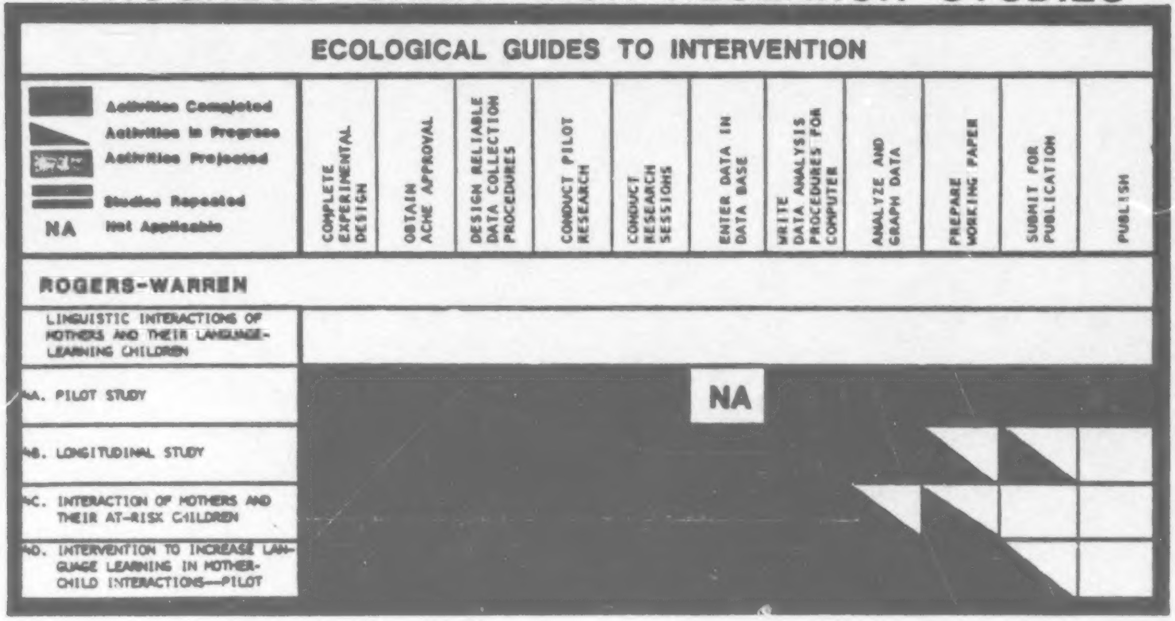


FIGURE 8

and defined were sufficiently sensitive to the differences in mother-child behavior to be appropriate for use in the longitudinal and cross-sectional analyses of teaching interactions.

Subjects. The subjects for this study were 10 normal children (two subjects at each of the following ages: 12, 18, 24, 30, and 36 months) and their mothers.

Setting. Observations were conducted in a playroom adjacent to the Language Project Preschool classroom. Age-appropriate toys and books were provided for the mother and child during the observation. No observers were present during the interaction, which was video taped by an unobtrusive camera.

Experimental Procedures. Each observation lasted about 30 minutes; only the last 15 minutes of the observation were video-taped and used for data analysis. The mother was instructed to play with her child and the toys available during the observation. No specific prompts to talk or interact with the child were given. Demographic, behavioral, and health information about the child and the family was collected using the standard Early Childhood Institute information form.

Each mother-child dyad was observed two times. The two observations occurred within a two-week period.

Transcripts of the interactions were prepared and verbal and nonverbal behaviors were scored from the videotapes using the definitions and procedures described in the Mother-Child Teaching Code, 1977.

Results. Mothers intents were grouped into five categories for analysis: (1) eliciting verbalizations, (2) encoding environmental events and relationships, (3) feedback for verbalizations, (4) feedback for nonverbal behavior, and (5) eliciting nonverbal behavior. Mother verbalizations eliciting verbalizations from the child increased with the child's increased age and apparent ability to respond verbally while requests (instructions) and feedback for nonverbal behaviors systematically decreased. These changes suggest that mothers shift their instructional focus from nonverbal to verbal child responses as children's linguistic abilities increased. Encoding remained fairly constant across mothers with children of different ages, although the complexity of encoding increased from single words (labeling) to complex statements describing relationships between objects and events or attributes of objects. Feedback for verbal behavior was somewhat variable across mothers but showed no systematic change with increasing age of the child.

Few systematic changes in the forms mothers used to express their intents were seen across children of different ages. Although mother's MLU increased in correlation with their children's increasing MLUs, the same general types of statements were used. For example, all mothers displayed a range of types of questions to elicit verbalizations from their children including Wh-questions, yes/no questions, and tag questions. Mothers of 12-month-old children used more yes/no questions than other mothers. Specific questions within each category were more complex for older children than younger ones, however.

All mothers consistently (averaging about 60% of the time) followed their children's verbalizations with related (continuous) comments, regardless of the intelligibility of the utterance to the observer (continuous utterances were defined by joint action, content of the verbalization, and other contextual cues, and, therefore, could be scored even if the child's utterance could not be transcribed completely). About 35% of all child utterances were followed by statements that acknowledged or confirmed the child's statement. The intelligible utterances of younger children were consistently consequated with imitations by the mother, although mother imitations and expansions decreased with the age of the child.

In general, these findings suggest that mothers' teaching tactics change in content but not in style as the child's linguistic skills increase with age. All mothers prompt and model appropriate verbal responses and, thus, insure that the child displays language or language-related behaviors at a fairly high rate. Mothers of the youngest children structured requests so that the child might indicate comprehension with a nonverbal response and generally, spent more time focusing on nonverbal behaviors. Yes/no questions and requests/commands requiring nonverbal actions related to a linguistic concept (example, "Show me the red one," "Give me a big one," "Where's the doggie?" occurred most frequently with the prelinguistic children (12 months old).

Discussion. Mothers appeared to use two strategies identified by Moerk (1974): build-ups and breakdowns. In a build-up sequence, mothers begin by asking a simple question and when a child responds appropriately to this question, mothers continue by asking for slightly more complex information. Breakdown sequences begin with a relatively difficult question. The mother proceeds by making the question simpler until the child is able to give an appropriate answer. In either the build-up or breakdown sequence, the goal of the mother is to get the child to verbalize correctly and she insures a successful interaction episode by adjusting the response requirements to the child's immediate competency.

The results of this pilot study suggest that mothers use consistent strategies to teach their children linguistic and conceptual information. The components of these strategies are identifiable and can be coded reliably across children of different ages. Mothers respond to most child utterances and provide a reasonably large amount of acknowledgement of feedback for the child's language. Although mothers seldom use obvious praise or blatant corrective feedback, they do provide a range of consequences for child utterances that includes positive statements, statements that simply acknowledge an utterance, implicit corrections of the child's utterance, and sequential prompts that support the child's efforts to respond correctly.

## STUDY 4b: DESCRIBING THE LINGUISTIC INTERACTIONS OF MOTHERS AND THEIR LANGUAGE-LEARNING CHILDREN: A LONGITUDINAL STUDY

(PI: Rogers-Warren)

Subjects. The subjects for this study were 20 children and their mothers. Ten child-mother pairs have been selected from populations of infants identified as handicapped (Down's Syndrome and other moderate retardation) and normal. All subjects are caucasian, low SES. Preference has been given to children screened in the infant assessment project. Observations began when normal infants reached 16 months and continued until the child was 34 months of age. Handicapped children varied in ages; all were at a developmental level near 16 months when the study began. Demographic and traditional assessment (Bayley scores) data were collected on each child at the beginning of the study. Caldwell Home Inventories were completed at the beginning and end of the study.

Setting. All observations were conducted in the home. To provide some consistency across home settings, a set of age-appropriate toys was provided for the child and mother during each observation. During the first 10 minutes of each observation, mother and child played with the provided toy; during the last 10 minutes, mother selected toys from those in the household.

Experimental Procedures.

1. Observations: Each observation lasted 30 minutes; however, only the middle 20 minutes of data are used. Data were collected by video tape-recording the mother-child interaction. To the extent possible, the same observer visited the family for each observation. Several practice observations were conducted prior to the beginning of the study to allow the child and family an opportunity to become comfortable with the observer. Child-mother pairs were observed once each month.

2. Transcriptions of tapes and preparations of protocols: Verbatim transcripts were prepared from the video-recordings. Transcriptions were done in regular orthographic spelling unless a phonetic description of an utterance appears necessary. Both parent and child verbalizations were transcribed, and child compliance to instructions and requests was noted on the transcript.

3. Coding transcriptions was done, utterance by utterance, by trained graduate student coders. Mother behavior was coded according to pragmatic intent and form. Child behavior was coded according to pragmatic intent. Child compliance and nonverbal answers were also scored in conjunction with mother's verbal behavior. The transcripts were segmented into episodes on the basis of joint attention and activity. Reliability was assessed regularly on all aspects of coding for all subjects.

# Results

## Data Base

A total of 440 observations were conducted, coded and entered for analysis. Each observation contained from 200 to 800 mother utterances and from 35 to 400 child utterances and behaviors. All mother and child utterances were coded, using the Mother-Child Code VI. A summary of code categories is presented in Table 3.

Data were organized in two ways. For normal children, data were organized across months and graphed by the child's age. For both normal and handicapped children, data were organized into MLU ranges. The purpose of this organization was to allow comparison of children at the same productive verbal level, without regard for the child's chronological age. This organization follows the recommendation of Rondal (1978) and proved to be a useful strategy. This organizational approach made the slower development of the handicapped populations quite clear. While normal children contributed samples to all seven MLU ranges (extending from 1.0 - 4.0 at approximately equal intervals), the handicapped sample contributed to only the three earliest ranges. Thus, direct comparisons between groups was more limited than initially anticipated.

In addition to compiling frequencies and percentages of each category of mother and child behavior, contingency tables detailing the relationship between specific mother and child behaviors were developed to allow an analysis of child responsiveness and mother feedback for various categories of child behavior.

An extremely rich verbatim data base, consisting of all mother and child utterances, was compiled, but was not analyzed for the current report. The findings reported herein refer only to the coded portions of the existing data base. The verbatim samples will be analyzed in future, and outside funding is being sought to support these analyses. Analyses of vocabulary growth, incidental learning, and mediational imitation are proposed as topics for future work. The organization of the data base has been developed with these analyses in mind.

## Data Analysis

Two types of analyses were performed. First, data from individual dyads was counted, and trends across age and/or increasing MLU were studied, using a regression analysis. The graphic analysis highlighted individual differences in parents and their children and allowed examination of small changes in specific behaviors across time. Session by session (organized by increasing age or increasing MLU), graphs were prepared for both the normal and the handicapped groups; comparisons of trends and rates of behavior were made. On the basis of these graphs, categories for statistical analyses were selected.

Second, based on the trends evident in the graphic analysis, analyses of variance were performed for the first two MLU levels (MLU 1.0 - 1.25

## Table 3

## Summary of Mother-Child Code Categories

### MOTHER BEHAVIORS

#### Elicits Verbal Behavior

| | |
|---|---|
| SF | Elicits a Specific Form |
| SFM | Elicits a Specific Form with Model |
| IO-Q | Information/Opinion Seeking - Question |
| CE | Elicits a Clarification or Elaboration |

#### Elicits Acknowledgement

| | |
|---|---|
| RTY | Receptive Testing - Yes/No |
| IQ-Y | Information/Opinion Seeking |
| ENQ | Encoding as Question |
| RQ | Response Question |
| AIQ | Adds Information as Question |

#### Elicits Nonverbal Behavior

| | |
|---|---|
| I | Instruction |
| RTNV | Receptive Testing - Nonverbal |

#### Feedback for Verbal Behaviors

| | |
|---|---|
| PFV | Positive Feedback (praise) for Verbalization |
| CFV | Corrective Feedback for Verbalization |
| AV+ | Acknowledgement of Verbalization - Positively-Stated |
| AV- | Acknowledgement of Verbalization - Negatively-Stated |

#### Feedback for Nonverbal Behaviors

| | |
|---|---|
| PFNV | Positive Feedback (praise) for Nonverbal Behavior |
| ANV+ | Acknowledgement of Nonverbal Behavior - Positively-Stated |
| ANV- | Acknowledgement of Nonverbal Behavior - Negatively-Stated |

#### Comments

| | |
|---|---|
| EN | Encoding |
| AI | Adds Information |

#### Answers

| | |
|---|---|
| AY | Answers with Yes or No |
| AEN | Answers by Encoding |
| AAI | Answers with Additional Information |

#### Other

| | |
|---|---|
| VOC | Vocative |
| RDG | Reading |
| OTH | Other |
| XXX | Unintelligible |

### CHILD BEHAVIORS

#### Nonverbal Behaviors

| | |
|---|---|
| C | Compliance |
| NC | Noncompliance |
| OC | Compliance Unknown |

#### Vocalizations

| | |
|---|---|
| VO | Vocal Behavior |

#### Verbal Behavior

| | |
|---|---|
| ANS | Answer |
| NVA | Nonverbal Answer |
| CT | Comment |
| Q | Question |
| QCL | Clarification Question |
| RC | Request/Command |
| VOC | Vocative |
| AV | Acknowledges Verbalization |
| ANV | Acknowledges Nonverbal Behavior |
| PRO | Protest |
| OTH | Other |

and MLU 1.26 - 1.50). The ANOVA was limited to these MLU intervals because the handicapped children did not contribute sufficient data to later MLU intervals for group comparisons. Utilizing the two MLU levels and the two groups (handicapped and normal), a 2 x 2 analysis of variance with repeated measures was conducted. A wide range of variables was analyzed: general categories of mother functions; mother behaviors within the general category of mother elicits verbal behavior; child responsiveness to various mother behaviors; mother contingencies (e.g. feedback); mother linguistic measures related to child verbal behavior; and various child functions (e.g. questions, comments, etc.).

### Mother Functions

General categories. There were no significant differences between the groups for any of the following major categories of mother behavior: elicits verbal behavior, elicits non-verbal behavior, feedback for verbal behavior, feedback for non-verbal behavior, or vocatives. Data comparing these categories are shown in Figures 9-12.

There were significant differences for both groups between MLU levels 1 and 2 for elicits verbal behavior, elicits non-verbal behavior, feedback for verbal behavior, and vocatives. The only nonsignificant MLU relationship was feedback for non-verbal behavior. In mean scores, elicits verbal behavior increased across both groups, and elicits non-verbal behavior decreased (see Figures 9 & 10). Feedback for verbal behavior increased, feedback for non-verbal behavior decreased, and vocatives decreased (Figures 9 & 10).

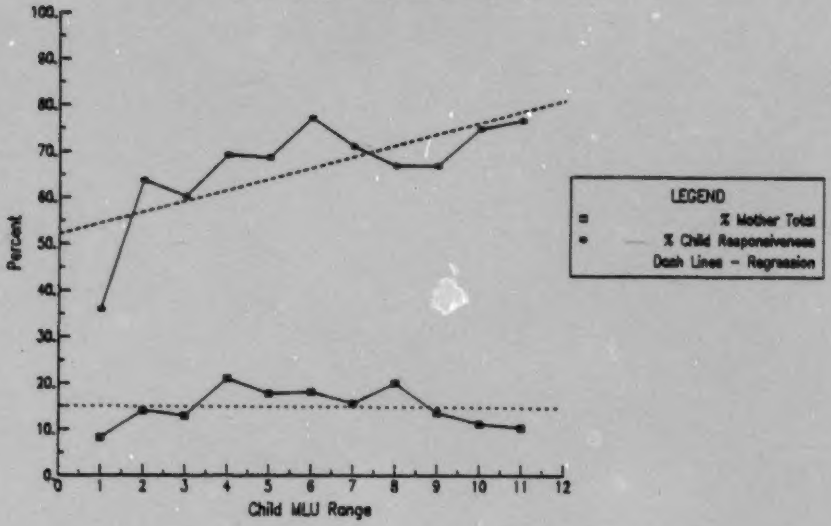
Within 'elicits verbal'. Data on categories within 'elicits verbal' are presented in Table 4. There were no significant differences in two

-------------------------
Insert Table 4 about here
-------------------------

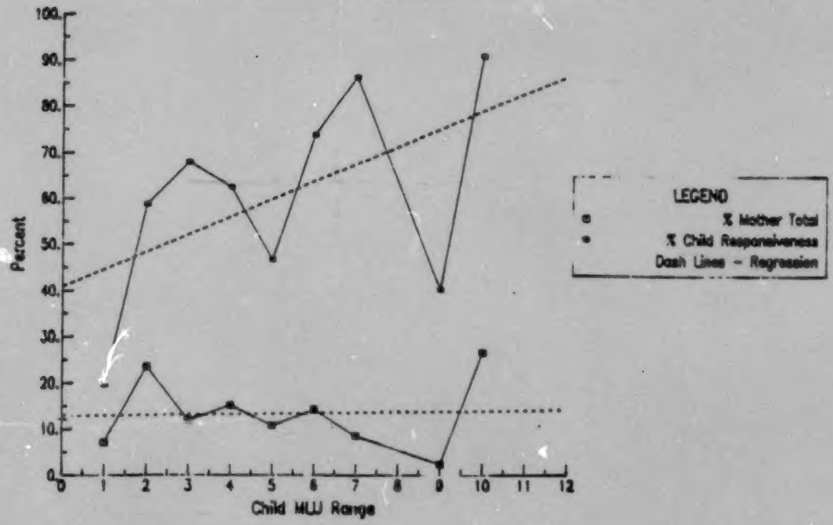
sub-categories of mother elicits verbal behavior: elicits specific form (SF) and specific form--model (SFM). Normal children had proportionally more "specific form" elicitations, and their proportion increased from MLU level 1 to level 2; handicapped children had less and the rate decreased from MLU 1 to 2. Proportionally more "elicits specific form-models" were addressed to the handicapped children, and this increased from MLU 1 to 2; the proportion to normals decreased from Level 1 to 2. There was also a significant difference for "elicits clarification" (proportionally more were addressed to normals) and a significant relationship for instructions by MLU for both groups across MLU 1 and 2.

### Child Responsiveness

There were no significant differences between the two groups in the measures of child responsiveness utilized (child responses following (1) any mother behavior; (2) mother elicits verbal; (3) mother elicits acknowledgement; (4) compliance; (5) child contribution to the conversation). Data on percent child responsiveness to various adult verbal

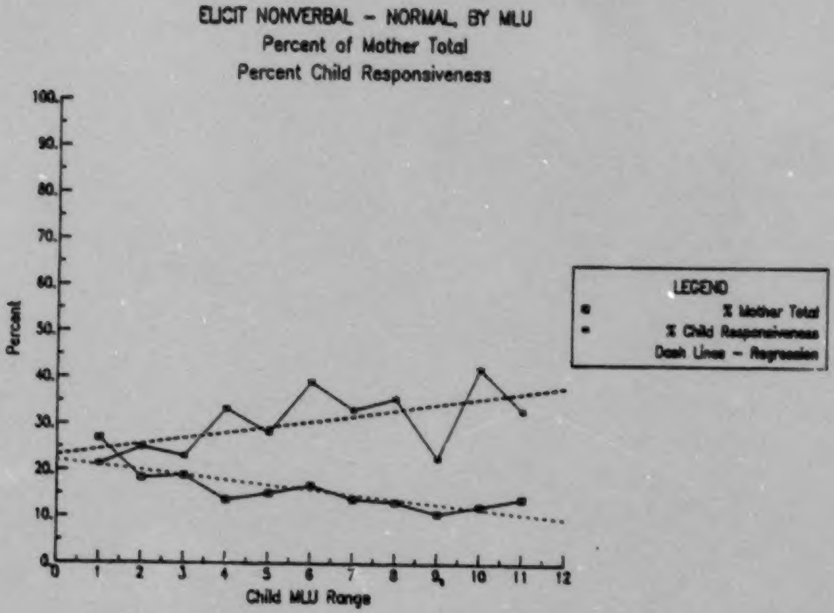


ELICIT VERBAL - NORMAL, BY MLU
Percent of Mother Total
Percent Child Responsiveness



ELICIT VERBAL - HANDICAPPED, BY MLU
Percent of Mother Total
Percent Child Responsiveness

Figure 9


ELICIT NONVERBAL - NORMAL, BY MLU
Percent of Mother Total
Percent Child Responsiveness

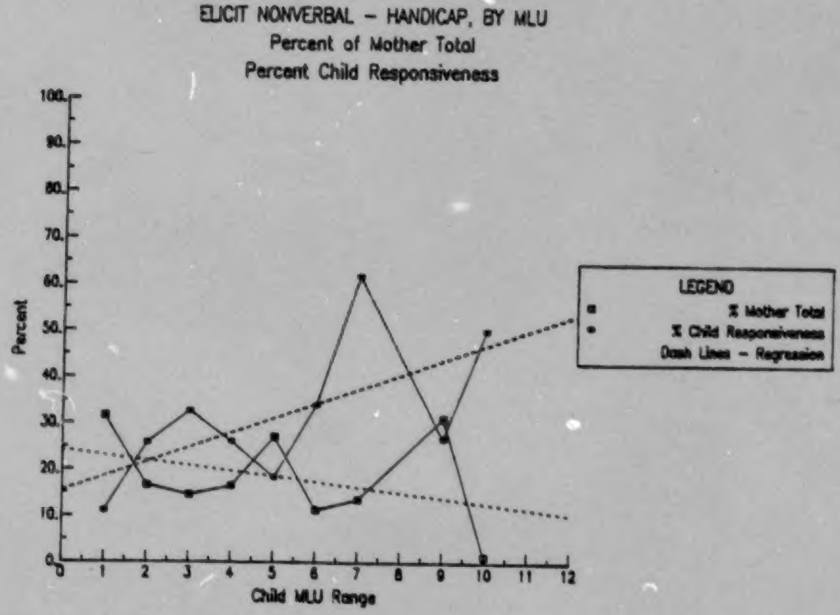
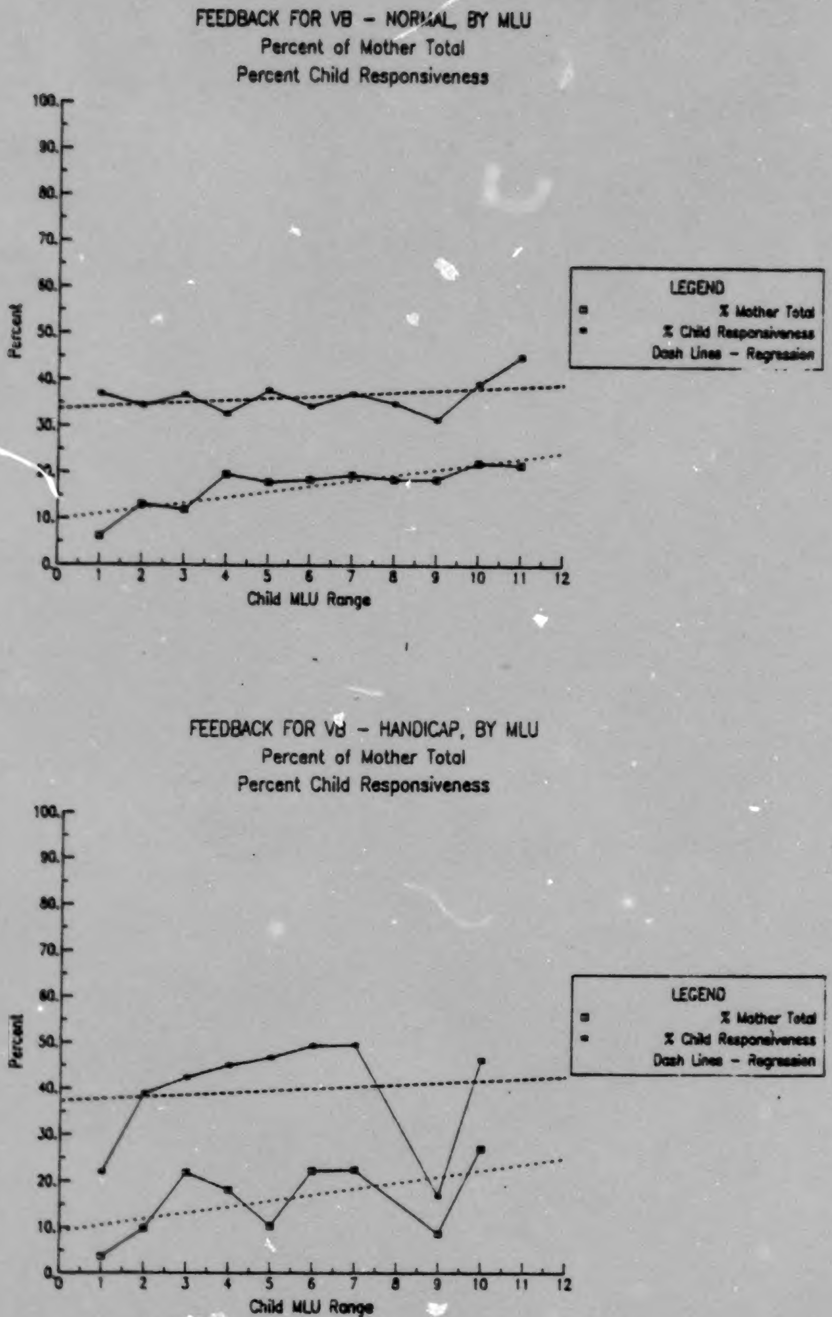

ELICIT NONVERBAL - HANDICAP, BY MLU
Percent of Mother Total
Percent Child Responsiveness

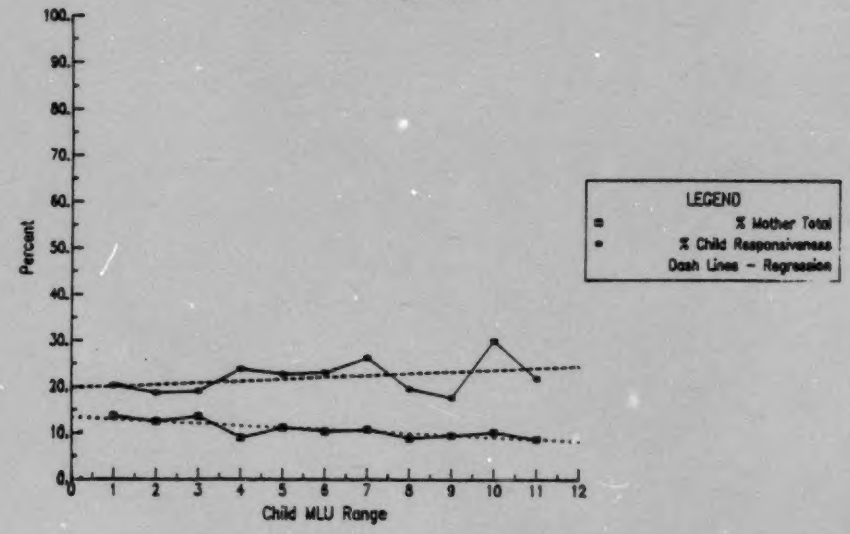
Figure 10



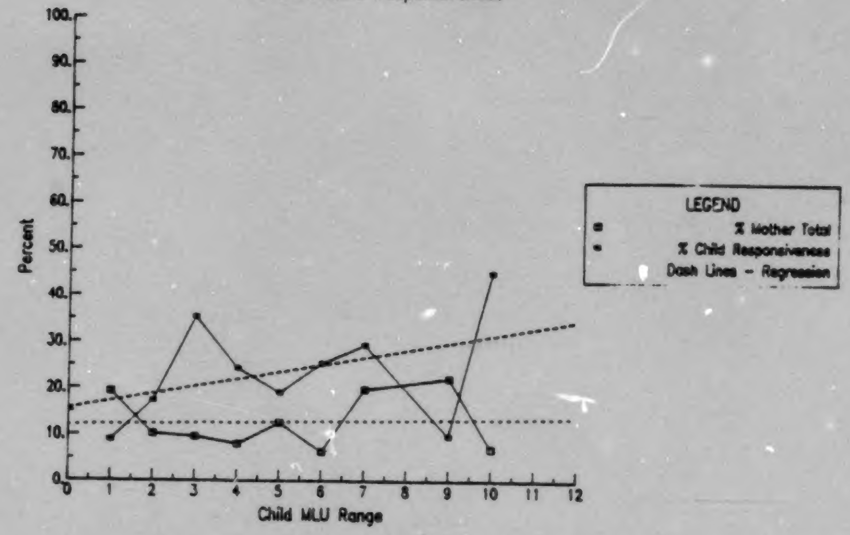
FEEDBACK FOR VB - NORMAL, BY MLU
Percent of Mother Total
Percent Child Responsiveness

FEEDBACK FOR VB - HANDICAP, BY MLU
Percent of Mother Total
Percent Child Responsiveness

Figure 11



FEEDBACK FOR NVB – NORMAL, BY MLU
Percent of Mother Total
Percent Child Responsiveness



FEEDBACK FOR NVB – HANDICAP, BY MLU
Percent of Mother Total
Percent Child Responsiveness

Figure 12

## Table 4

## Mother Functions Within The Category Of "Elicits Verbal"

Proportional Scores

| Variable | Handicapped MLU Level 1 | Handicapped MLU Level 2 | Normal MLU Level 1 | Normal MLU Level 2 |
|---|---|---|---|---|
| Specific Form* | 39% | 24% | 53% | 59% |
| Specific Form-Model* | 46% | 70% | 28% | 22% |
| Information or Opinion Seeking | 12% | 3% | 11% | 12% |
| Elicits Clarification | 3% | 3% | 8% | 6% |

*Denotes significant difference between the two groups overall behaviors are presented in Table 5.

-------------------------
Insert Table 5 about here
-------------------------

One interesting finding shown in Table is that the handicapped children became significantly more compliant from the first MLU level to the second. Meanwhile, the normal children remained equally compliant at the two MLU levels.

## Mother Contingencies

There were no statistically significant differences in total feedback received by the two groups although the normal children always received more feedback than the handicapped children. Also, no significant differences were found in terms of feedback for vocal behavior. The rate at which the children received feedback was similar at both MLU levels. As noted in the sub-study on mother questions, the child behaviors receiving feedback changed across increasing child language levels.

## Mother Linguistic Measures

There were no significant differences between groups in terms of complexity of mother verbal behavior as correlated to the child verbal behavior (rates of mother MLU to child MLU); however, mothers of normal children matched their children's levels somewhat more closely.

## Child Functions

Data on frequency of child functions are shown in Table 6.

-------------------------
Insert Table 6 about here
-------------------------

Frequency of child answers were significantly different between the handicapped and normal children. The handicapped children gave about twice as many answers at each MLU level. The number of child answers increased significantly for both groups from MLU 1 to 2. Frequency of comments was not significantly different between the handicapped and normal children. Rate of request-commands were significantly different between the handicapped and normal children. The normal children made far more request command statements (8 to 1 approximately). Both groups made fewer request commands at MLU 2 but the decrease was relatively greater for the normal children. No significant difference was found in protests. Normal children made more protest statements. There was no significant MLU relationship. Normal children asked significantly more questions than handicapped children (overall means were 16 and 1 per session, respectively). There were no significant relationships to MLU.

In summary, the normal children made significantly more request commands, asked a significantly greater number of questions, and made

## Table 5

## Child Responsiveness

| Variable | Handicapped<br>MLU Level 1 | Handicapped<br>MLU Level 2 | Normal<br>MLU Level 1 | Normal<br>MLU Level 2 |
|---|---|---|---|---|
| Total Responsiveness | 20% | 33%* | 20% | 31%* |
| Mother Elicits Verbal | 30% | 57%* | 30% | 54%* |
| Mother Elicits Acknowledgement | 28% | 41% | 24% | 36%* |
| Mother Comments | 21% | 26% | 19% | 28%* |
| Compliance | 37% | 46%* | 41% | 43% |
| Proportions of total interactions contributed by child | 19% | 28%* | 20% | 27%* |

*Denotes significant differences at or above the .05 level.

Table 6

Child Functions: Overall Mean Frequencies

| Child Function | Handicapped | Normal |
|---|---|---|
| Answer* | 39 | 22 |
| Comment | 29 | 43 |
| Request/Command* | 1 | 7 |
| Vocative | 7 | 4 |
| Protest* | 0.6 | 6 |
| Question* | 1 | 16 |

*Denotes significant difference between the two groups significantly more protests than the handicapped children. The handicapped children gave a significantly greater number of answers. There was no significant difference in vocatives or comments between the groups.

## General Summary

The data suggest that at the same MLU level, normal children initiate much more behavior. They make more requests, ask more questions, and use more vocatives. They are more outgoing, as indicated by their use of pragmatic functions which seem to control the environment. At the same MLU level, both groups are almost equally responsive. However, mothers of handicapped children used a simpler elicitation form with their children--elicits specific form with a model--than mothers of normal children at the MLU 1 level. They even increased their relative use of this strategy at the MLU 2 level, while mothers of normal children were decreasing it. So, mothers of handicapped children helped their children seem more responsive by their choice of forms for eliciting verbalizations.

Generally, there were no significant differences between the groups in the larger categories of mother functions (e.g., mother elicits verbal) or in mother contingencies at the same MLU ranges. Also, not surprisingly, there were many changes in mother and child behavior related to MLU level for both groups.

## Discussion

### Mother behavior

Within both groups, mothers varied considerably in the frequency of their verbalizations and in the distribution of their pragmatic and teaching functions. Some changes across time were consistent regardless of mother frequencies or distributions. Over time, all mothers requested more verbal behavior and decreased their requests for nonverbal behavior. (See Figures 9 and 10). All mothers acknowledged a very large proportion of their children's intelligible and unintelligible speech; however, only a few mothers actually praised their children for talking. In other words, mothers contingently responded with feedback for verbalizations, but this feedback was generally mildly encouraging or corrective. No mothers gave negative feedback of a punishing nature; however, almost every mother occasionally indicated when the child's response was incorrect. Overall, feedback was very gentle and the mothers were typically accepting of child approximations of correct answers.

The overall lack of significant differences between mothers of normal children and mothers of handicapped children at the same MLU level, supports the conclusion that it is the child's particular productive skills (and possibly receptive skills) which shape the content and focus of mothers efforts to teach their children. As long as a child is functioning linguistically within a given range, mothers behave similarly, regardless of the child's status as normal or handicapped. In some ways this finding is surprising. In several instances handicapped children remained within the first MLU range (1.0 - 1.25) for as long as 12 to 15 months. Although there was variability in mother rate and modest change in content, in general, mothers behaved quite similarly throughout the period the child was in that complexity range.

During these early MLU ranges, mothers are doing considerable teaching: they provide models for imitation and they prompt children to make nonverbal responses that indicate comprehension of instructions, relational terms, and labels. In general, mothers of handicapped children were providing more support (by nature of the explicitness of their cues) than mothers of normal children. The effects of this difference may be twofold. First, by providing more explicit support, mothers of handicapped children maximize their children's responsiveness and allow them to participate in the interaction with minimal verbal skills (i.e. imitation rather than spontaneous answering). Such support may be necessary with all children at the very early stages of productive language, but more necessary when the child is slow to acquire forms, as evidenced by the duration of MLU level 1 with handicapped children. On the other hand, matching of the child's productive level for extended periods of time may not be beneficial to the handicapped child because it does not necessarily facilitate the growth of the child's skills. In sum, the techniques used by mothers of normal and handicapped children (matching their child's productive language level, eliciting verbal responses, consequating children's responses and so forth) may be necessary, but not sufficient for supporting accelerated language learning by handicapped children.

## Child behaviors.

The language of handicapped children develops much more slowly than that of normal children. Typically, it has been assumed that although development was slower, language development of handicapped children followed essentially the same pattern as normal child language development. The results of this study suggest that there are significant differences in the ways normal and handicapped children are using their language at the same complexity levels. These qualitative differences may be important to understanding the nature of language delay and the particular characteristics of deficient language learning strategies.

Although reliability figures for normal and handicapped children's data were quite similar (both exceeding 85% on all categories of scoring across more than 50 reliability estimates), coders reported greater difficulty in transcribing and coding handicapped children's language. Handicapped children's data were more limited (fewer utterances, less variety in vocabulary and syntactic structure), even at the same complexity levels, than were the data for normal children. More detailed linguistic analyses are warranted before making any specific conclusions relating pragmatic functioning and linguistic complexity; however, there appears to be a difference in the relationship of these two components of the communication system for the two groups of children.

## Implications and recommendations

The current research project has identified several strategies that mothers of normal and handicapped children use to elicit and support language use by their children. The similarity of strategies between the two groups of mothers suggests that the strategies are common ones, which change in specific form with increases in child skills. The marked delays in language development by the handicapped group suggests that alternative strategies are needed to facilitate handicapped children's development. Ideally, such alternative strategies should build on the behaviors mothers typically use to teach language. Relying on some existing patterns of interaction has two potential benefits. First, the mother already has many of the skills for interacting with and teaching her child; instructing her in elaborating these strategies is an easier task than teaching an entirely new set of techniques. Second, and perhaps more important, utilizing the existing patterns of interactions and building on mothers known teaching strategies may facilitate the child's emerging abilities to learn from naturalistic interactions. That is, if interventions are similar to the naturally occurring learning opportunities, it is likely that generalization to unprogrammed instances for learning will occur more readily than if the training strategy is radically different from naturally occurring interactions.

Within these guidelines, there is a need to formulate specific techniques for parents to use with their handicapped children, to verify that parents can acquire and generalize these techniques, and to demonstrate that handicapped children's language and communication development can be facilitated by the application of such strategies.

The results of this study concur with those of Rondal (1978) in demonstrating that mothers of handicapped children are adjusting to their children's skills in a manner similar to normal mothers. The dysfunctional nature of parent-child interaction (in learning new information) appears to be primarily a result of the child's slower rate of development and more limited response repertoire, rather than atypical mother behavior. By introducing our interventions to parents with such information, it may be possible to support and encourage their existing efforts, while training teaching strategies that function optimally with handicapped children.

## STUDY 4b (Substudy 1): DESCRIBING MOTHERS' USE OF LANGUAGE TEACHING STRATEGIES: A LONGITUDINAL ANALYSIS
PIs: Rogers-Warren and Nielsen)

Purpose. The purpose of this study was fourfold: the first was to target and quantify those child-directed utterances provided by the mothers which functioned to elicit verbalizations from their children; a second part of this goal was to provide a descriptive analysis of such utterances along the dimension of cue (pragmatic intent), form (syntactic structure), and complexity (sophistication of the required child response). The second aid was to quantify the linguistic progress of the children, and the third, to evaluate the systematic changes in the pattern of mothers' elicits-verbal utterances over time, as their children become more linguistically mature. Finally, the study was designed to assess the role of the mothers as natural language teachers who use effective and functional strategies to maximize their children's lingustic advancements.

Subjects. Nine (9) mother-child dyads participated in the study. The children were considered by their mothers to be developing normally and scored in the normal range on a traditional assessment test (Bayley). The dyads were caucasian, lower middle SES, and had adequate home environments (as measured by the Caldwell Home Inventory). The children were 16 months old when the study began.

Setting. All observations were conducted in the home and were videotaped by a home observer. Observations were taken once each month during an 18-month period. Observation sessions were 20 minutes and included a 10-minute structured play session (the home visitor provided the toys to enhance consistency across home settings) and a 10-minute unstructured play session (the mothers chose the toys from those in the household). Mothers were asked to play with their children.

Experimental Procedures.

1. Sample selection. Five samples selected for analysis occurred when the children were 16, 21, 24, 30, and 34 months old. This set of samples was selected to coincide with major linguistic changes in child development during the 18-month observation period.

2. Transcriptions of tapes and preparation of protocol. Verbatim transcripts were prepared from the video-recordings. Both mother and child verbalizations were transcribed and child compliance to instructions was noted on the transcript. Linguistic descriptions of mothers' and children's language were calculated. These measures included mean length of utterance (MLU), upperbound (UB), and child intelligibility.

3. Coding of mother function. Each mother utterance was coded for its apparent pragmatic and teaching function. Those utterances which functioned to elicit verbal behaviors from their children were coded as EUVs and selected for further analyses. For comparison purposes, mother utterances which elicited non-verbal behaviors were coded and their relative frequencies were calculated.

4. Coding of Mother EVUs. Each mother EVU was coded along the dimensions of (a) cue, (b) form, and (c) complexity.

   Cue: The cue category contained five types: (1) requests for specific form, including a model phrased as a statement (SFM) or (2) as a question (SFMQ), (3) requests for a specific form, phrased as a statement (SF), or (4) as a question (SFQ), and (5) information/opinion seeking questions (IOQ).

   Form: The form category contained six types, each type corresponding to a grammatical description of the mother's request for a verbalization: Type A (e.g., What is that?), Type B (e.g., What color is that?), Type C (e.g., What does that do?), Type D (e.g., What are you gonna do?), Type E (e.g., Can you say ball?), and Type X (any other syntactic structure).

   Complexity: The complexity category contained 6 levels: Level 0 included requests for imitations; Level 1 included requests for animal noises and labels; Level II was composed of requests for place, quantity, action, possession, color, or shape descriptors; Level III requested time, manner, or relationship descriptors; Level IV corresponded to requests for causality or probability; and Level V included requests which were non-activity bound.

   Each mother EVU was given three code types (one for cue, form, and complexity. Relative frequency was tabulated for each dimension over each sample month as well as child responsiveness to each dimension type.

5. Analysis of EVU Episode. When no child responses followed a mother's EVU, the mother's subsequent behavior was investigated. If she provided another EVU to elicit the same child response, then the two mother EVUs were considered as an episode. Changes in the episodic (second) EVUs, as compared to the original EVU along any dimension, were noted. The changes were tabulated and some patterns of change over time were determined.

6. Analysis of mother feedback schedules to child responses. After each child response to a mother EVU, there was an opportunity for the mother to provide feedback. Type (acknowledgements, corrections, or praise) of feedback and its frequency was tabulated. The percent of child responses consequated by feedback were calculated.

Results. Definite and steady increases were found in the linguistic description scores (total number utterances per sample, total number morphemes, upperbound and MLU) for the children across time; such increases were not found for the mothers. Individual mother scores remained fairly stable across the five sample months; only small adjustments in complexity of mother speech were noted (See Figure 13).

When mothers' utterances were examined for function there were changes occurring. Mothers were found to be providing more utterances

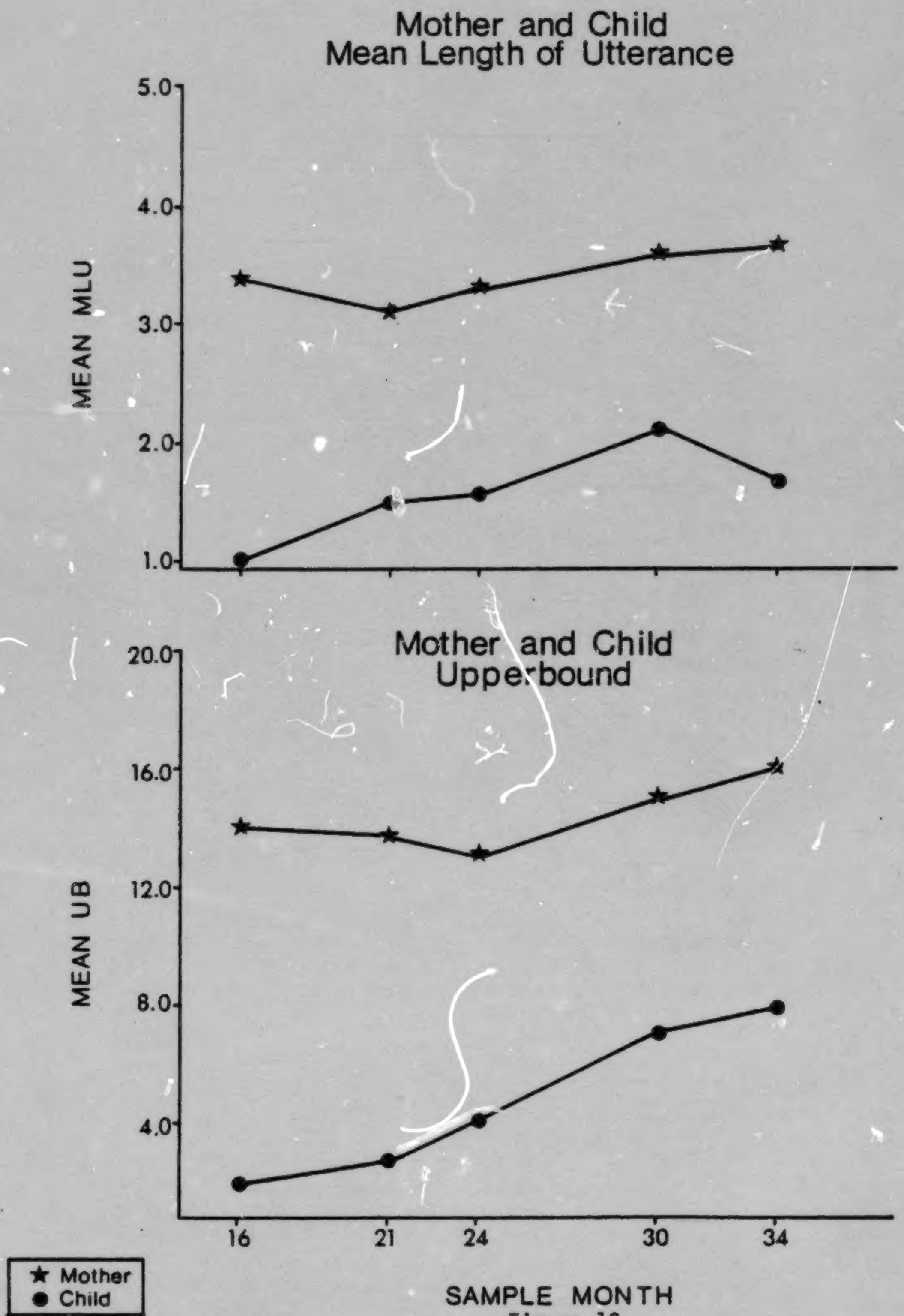

Mother and Child
Mean Length of Utterance
MEAN MLU
5.0
4.0
3.0
2.0
1.0
Mother and Child
Upperbound
MEAN UB
20.0
16.0
12.0
8.0
4.0
16
21
24
30
34
★ Mother
● Child
SAMPLE MONTH

Figure 13

which elicited non-verbal responses from their children in the earlier sample months and more utterances which elicited verbal responses in the later sample months (See Figure 14). Mothers were making different demands of their children over time with regard to the mode of child responsiveness.

There were also longitudinal changes within the dimensions of cues, (Figure 15), form (Figure 16) and complexity (Figure 17). Mothers increased the linguistic demands they placed on their children by providing less direct cues, using more open-end questioning forms, and by requesting more complex child responses over time. For most dyads, when the child could respond to a mother demand about 75% of the time, mothers began to use the next most difficult type of cue to elicit child responses. Use of episodic elicits-verbal utterances over time were found as well. Mothers' second EVUs became more complex over the observation time, but were consistently less complex than initial mother EVUs.

Mothers were also making changes in the feedback schedule they provided to child responses over time. Mothers provided less feedback to the responses which the children had mastered and more feedback for responses still being acquired. Acknowledgements of child verbalizations (rather than praise) were used most frequently at all ages.

Discussion. This longitudinal investigation provided descriptions of individual child language acquisition patterns, individual mother adjustment patterns, and the changes in the interactional patterns of the mother-child dyads. The analyses of mothers' child-directed language provided a data based analysis of mothers' sensitivity and ability to make incremental changes in verbal input and feedback, as their children became more sophisticated communicators over an 18-month period. The methodology also made possible the documentation of individual differences in the interaction patterns of the 9 mothers and their children over time.

Mothers use three important strategies for teaching language: linguistic adaptation to their children's current linguistic level to enhance attention and reception; functional adjustment by "upping the ante" as their children master easier skills; and behavioral techniques. By decreasing their MLU and upperbound, mothers approximate a match to their children's linguistic output. The mothers' slower and steady rate of utterance production allows their children to become more equal participants in the interaction, and the mothers' use of a conversational style provides opportunities for and encourages turntaking and interactive communication.

Mothers also make incremental changes in the qualitative aspects of their input. They elicit more verbal responses from their children over time, and they seem to use these responses as opportunities to teach their children by offering times for them to practice verbal responding. In addition, changes in mothers' elicits-verbal utterances along the dimensions of cue, form, and complexity demand that the verbal responses which the children produce become more linguistically

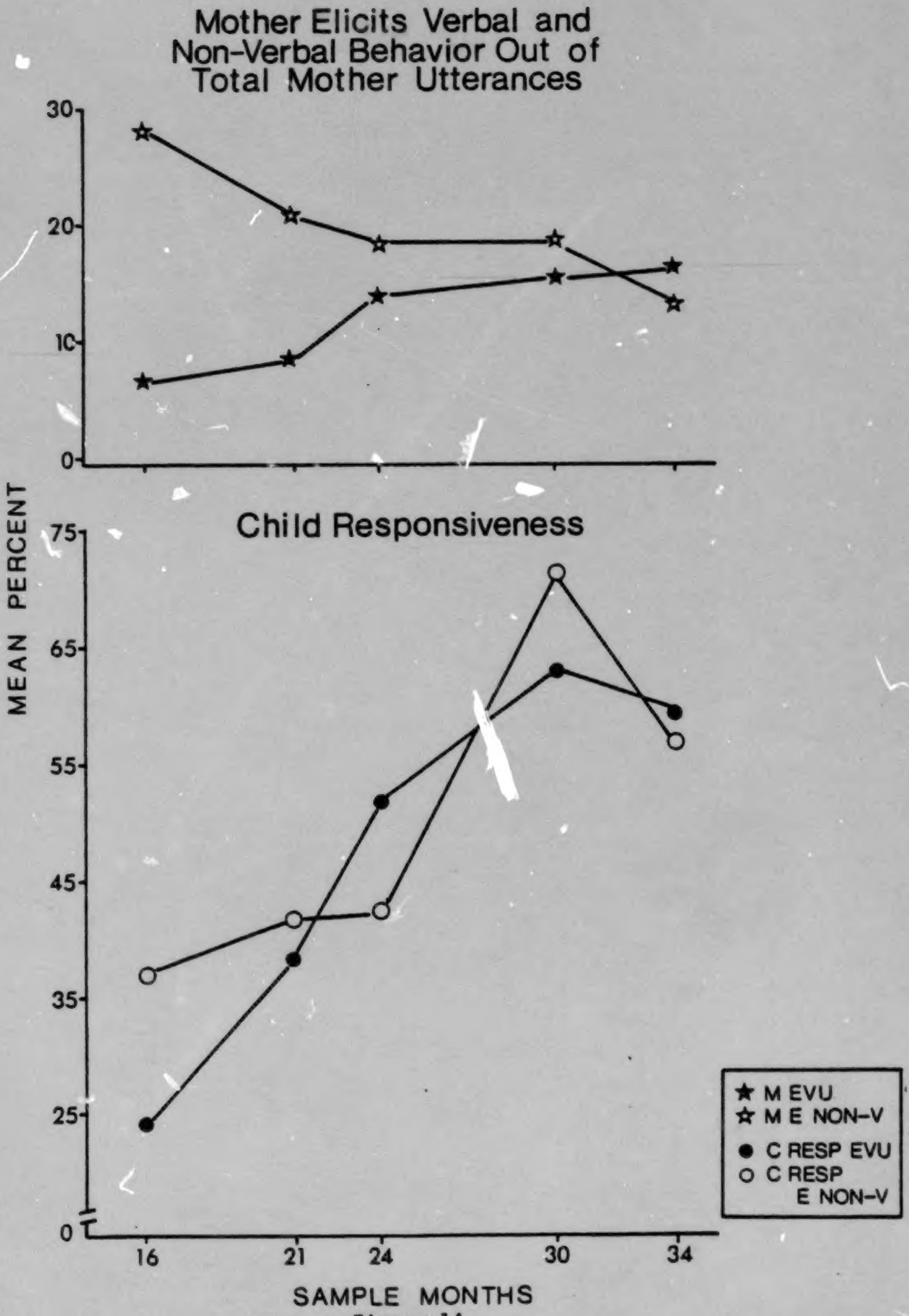

Mother Elicits Verbal and Non-Verbal Behavior Out of Total Mother Utterances
30
20
10
0
Child Responsiveness
75
65
55
45
35
25
0
MEAN PERCENT
16
21
24
30
34
SAMPLE MONTHS
★ M EVU
☆ M E NON-V
● C RESP EVU
○ C RESP E NON-V

Figure 14

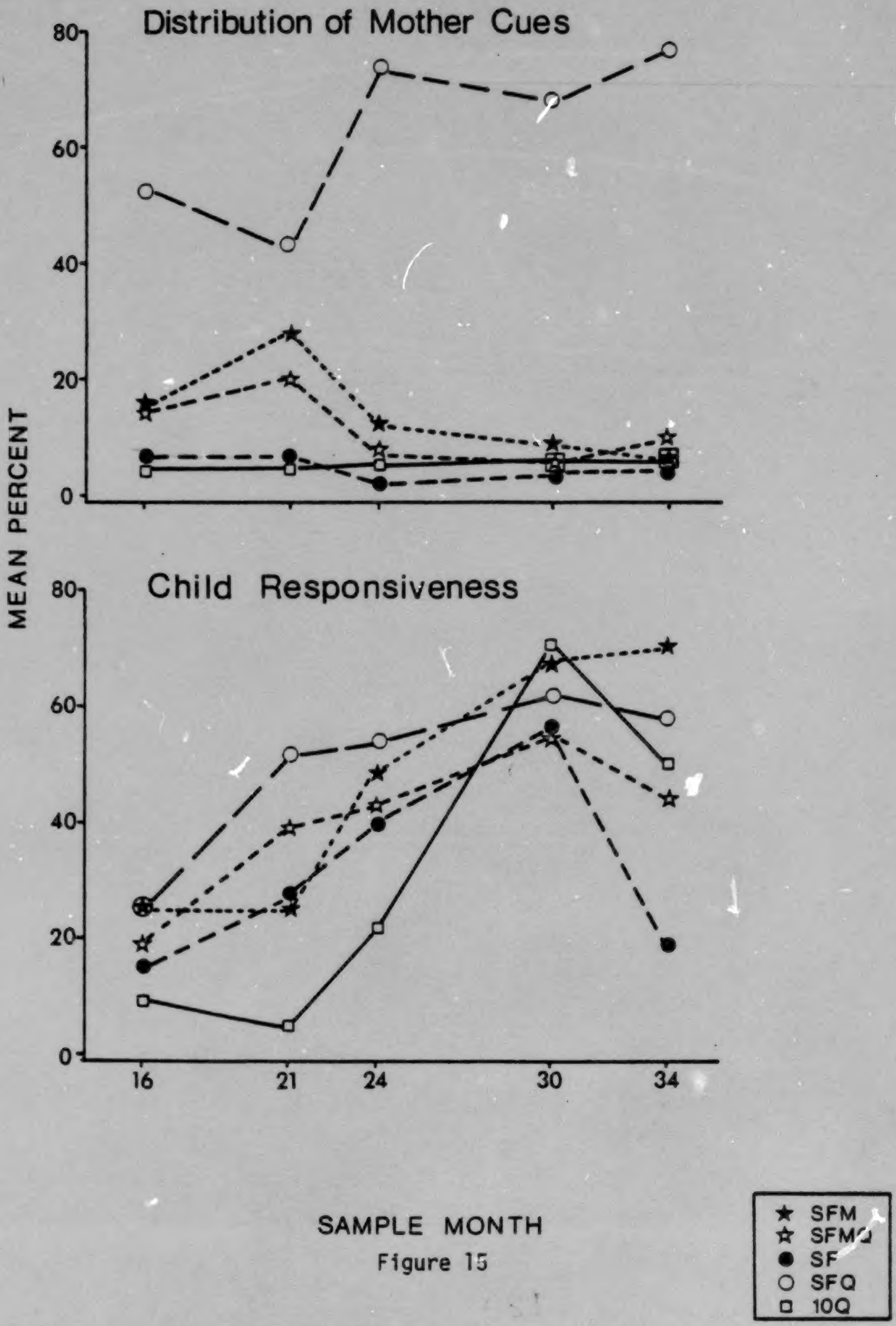

Distribution of Mother Cues
Child Responsiveness
MEAN PERCENT
0
20
40
60
80
SAMPLE MONTH
16
21
24
30
34
★ SFM
☆ SFMQ
● SF
○ SFQ
□ 10Q

Figure 15

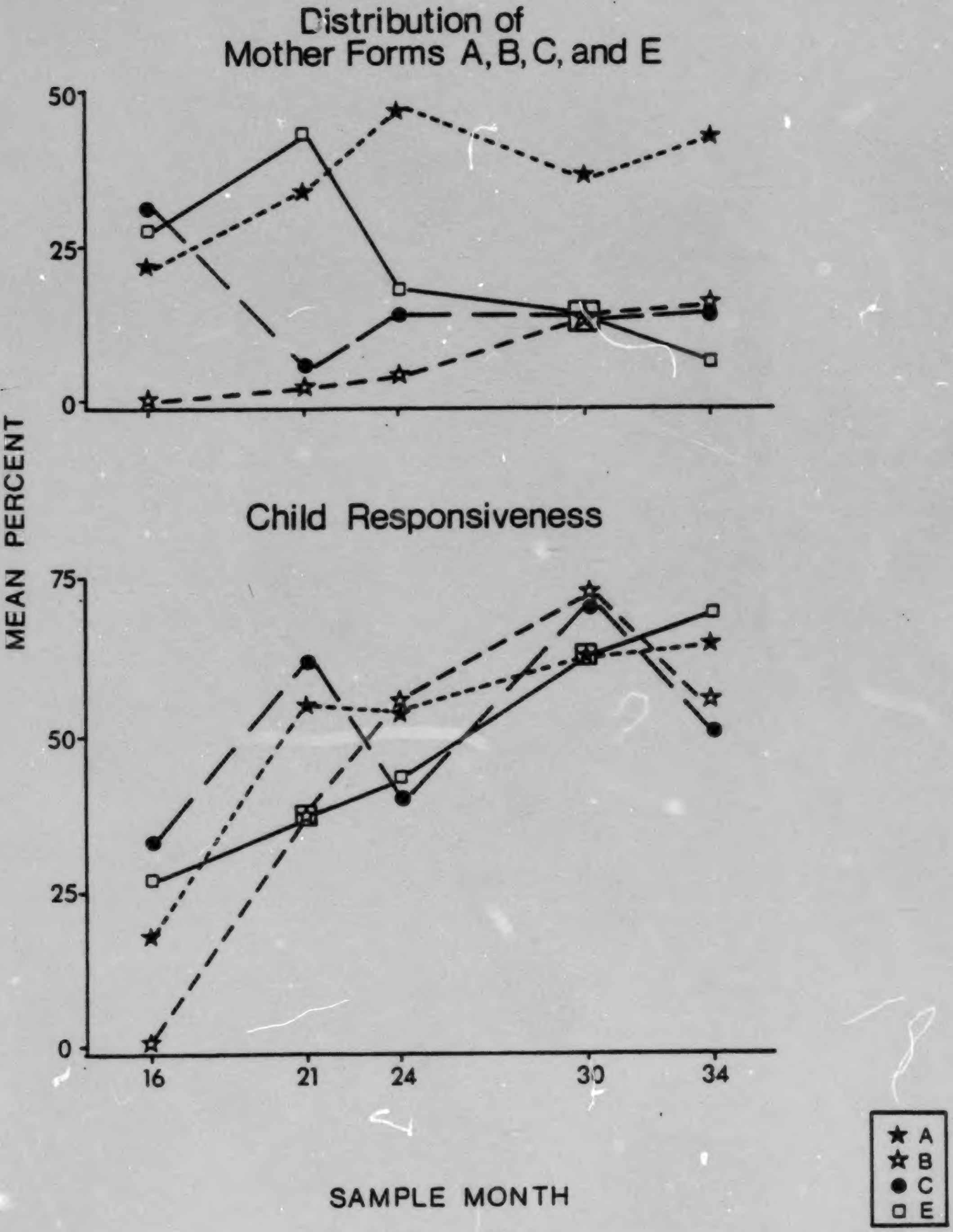

Distribution of
Mother Forms A, B, C, and E
50
25
0
MEAN PERCENT
Child Responsiveness
75
50
25
0
16
21
24
30
34
SAMPLE MONTH
★ A
☆ B
● C
□ E

Figure 16

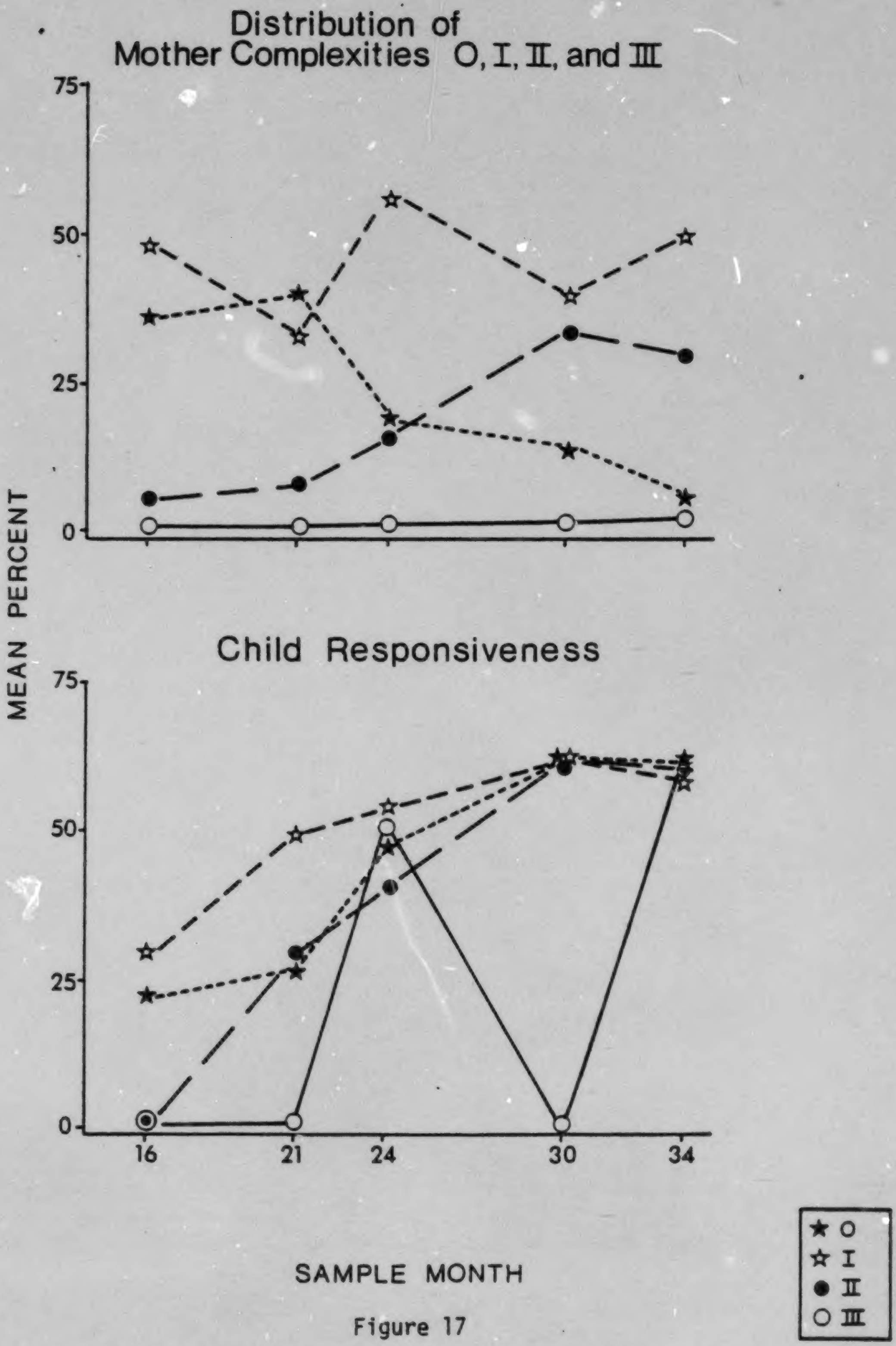

Distribution of Mother Complexities O, I, II, and III
MEAN PERCENT
75
50
25
0
Child Responsiveness
75
50
25
0
16
21
24
30
34
SAMPLE MONTH
★ O
☆ I
● II
○ III

Figure 17

sophisticated over time. Through the use of EVU episodes, mothers provide subsequent opportunities when original EVUs fail, and in doing so they provide more salient information to promote success. Mothers also use selective feedback to help shape appropriate and more sophisticated and socially acceptable language in their children.

Implications and Recommendations. The findings of this study suggest that mothers use several specific teaching strategies to elicit and teach language to their children. Clearly, the child's increasingly accurate and frequent responses to these efforts are keys to the facilitation of child language. For handicapped and at-risk children, it may be important to increase their responsiveness to mother teaching efforts, beginning in the first months of life. Strategies for increasing responsiveness in very young children should be explored and tested in the context of naturalistic mother child interactions.

A study similar to this one should be undertaken to analyze the effects of children's handicaps on their mothers' strategies and successes in eliciting verbalizations. Such a study would verify the role of child responsiveness and would provide an important baseline for considering intervention strategies.

Further, although the findings of the current study are clear, the mechanisms which permit mothers to adjust and match their demands to the child's changing communication repertoire are not yet apparent. The modest degree of matching between mother and child MLUs suggest that mothers consider other aspects of child behavior in addition to the complexity of the child's verbalizations. The shift in complexity of expected responses, which was seen when children had mastered responding to particular mother forms (at about the 75% level), may be one such mechanism which merits further consideration.

---

## STUDY 4c: DESCRIBING THE LINGUISTIC INTERACTIONS OF MOTHERS AND THEIR AT-RISK CHILDREN

(PI: Rogers-Warren)

Purpose. The purpose of this study was to compare the teaching interactions of mother-child dyads, in which the child has been determined to be at-risk for developmental delay, with interactions of mother-child dyads, in which the child is developing normally.

Subjects. The subjects for this study were 24 mother-child dyads in which the child had been identified as being at-risk for developmental delay. Risk was determined by the child's performance on the Bayley Scales of Infant Development or the Stanford-Binet, and evidence of health, familial, or environmental factors that were likely to signal risk. Four subjects were selected at each of the following mean lengths of utterance (MLU): 1.0, 1.5, 2.0, 2.5, 3.0, 3.5.

Setting. All observations are conducted in the home. Age-appropriate toys were provided.

Experimental Procedures. All procedures were identical to those described for the longitudinal study. Two 20-minute samples are being collected within a 4-week period.

Data Analysis. The same analyses will be performed with these data as those described for the longitudinal study. The content, pattern frequency, and effect of teaching interactions observed in this study will be compared with those observed with normal and handicapped subjects in the longitudinal study. Samples for comparison will be selected by matching on the basis of the MLU of the at-risk child.

Results. All data for this study have been collected and coded. However, they have not been analyzed for two reasons. First, there were insufficient samples of handicapped children at the higher MLU ranges (particularly data samples are lacking in the 2.5, 3.0 and 3.5 range). In order to make a statistically valid comparison at these age ranges, it will be necessary to collect additional samples of handicapped children in those ranges. Second, there has been a marked inconsistency in the MLU's obtained for the same child across the 4-week period in which the two samples were obtained. As a result, several children's data has been assigned to more than one MLU range for analysis; these assignments again yield unequal numbers of subjects contributing to each range. In some cases the unequal contributions are not a problem, but in other cases the inequality is (1 sample vs. 9 assigned to MLU's 2.5 and 2.0 respectively). Since the initial analyses of data for dyads in this study has suggested some important trends in mother and child behavior, it is proposed to continue to collect additional samples (using other funds) to complete the analysis. However, insufficient research personnel were available to complete the additional data collection in time for analysis for this report.

## STUDY 4d: AN INTERVENTION STUDY TO INCREASE LANGUAGE LEARNING IN MOTHER-CHILD INTERACTIONS: A PILOT STUDY

(PI: Rogers-Warren and Albert)

Purpose. The purpose of this study was to investigate procedures for improving the linguistic interactions of mothers and their handicapped children. Data analyses in the longitudinal study suggested quantifiable differences in the handicapped and normal dyad interactions. In particular, because the handicapped children were generally less responsive than the normal children, mothers of handicapped children presented more instructions and direct questions to maintain child responding. Although these tactics are successful in the short term, they produce a didactic question-answer type of interaction which ends when the mother ceases questioning or instructing.

It was proposed to investigate training parents to do three things in interactions with their handicapped children: to respond to child initiations, regardless of the accuracy or completeness, as if they were attempts to communicate; to wait for child initiations in circumstances when it is likely the child will need to communicate; and, to incidentally teach new linguistic information during interactions with the child, without disrupting the flow of the "conversation."

In developing the actual parent intervention program, the above three goals were expanded and systematized into four intervention procedures: (1) The Model Procedure is designed to build nonimitative, or informational responding. (2) The Mand-Model Procedure elicits verbalizations and teaches new language incidentally. (3) The Delay Procedure functions to strengthen the child's rate of spontaneous verbal initiations. (4) The Incidental Teaching Procedure is used to build more complex or elaborated child responses.

It was proposed to investigate mothers' abilities to sequentially learn and apply the Model, Mand-Model, Delay, and Incidental Teaching procedures. Independent variables, including mothers' rate and percent correct use of the procedures, were measured. The effects on the dependent variables or changes in child behaviors, including rate, intelligibility, vocabulary, and mean length of utterance were also measured. In addition, mothers' abilities to generalize use of the trained techniques to two non-training situations were assessed. Measures of mothers' maintenance of the intervention procedures were assessed regularly during the three months following training.

Subjects. Subjects included six boys between 2.9 and 4.0 years of age and their mothers. A variety of standardized tests was used to assess the children's language skills prior to treatment. Results of the evaluations indicated that each child had an expressive language delay of at least one year. Four of the mothers had high school levels of education, one mother was a senior in college, and one mother had a master's degree in learning disabilities.

Setting. Two settings were used in the study: a clinical training setting and a home-observation setting. Four training sessions, one for each intervention procedure, were conducted at the Language Project Preschool. Mothers were observed using the trained technique(s) with their children, and feedback was given on use of the technique(s), during home observation sessions that occurred twice a week for each family. Generalization and practice data were also collected in the homes.

Experimental Procedures. Training consisted of the following: lectures; training tapes showing the trainer using the techniques with three different children; modeling the use of the technique with the target child by the trainer; and feedback following practice of the technique by the mother with her child. After initial training on each technique, bi-weekly observations and feedback sessions were conducted in the home. During these sessions mothers and children played with one or more toys during a 15-minute audiotaped session. At the beginning of each session, descriptive and graphic feedback were given on the use of the technique(s) during the previous session. After 10 minutes of play, mothers were given specific feedback on their application of the procedures. Also, selected examples of correct and incorrect use of the techniques just used were played back from the audiotape. An additional 5 minutes of practice followed and feedback was given again.

Mothers were trained to arrange the environment to facilitate talking by the child and to apply four language teaching procedures: (1) the Model Procedure; (2) the Mand-Model Procedure; (3) the Time-Delay Procedure; and (4) the Incidental Teaching Procedure. The four teaching techniques were trained in the order specified to facilitate teaching the goals of the next-trained technique. The steps of each procedure applied by the mothers were cumulative. For example, learning the basic steps in the Model Procedure facilitated learning the slightly more complex Mand-Model Procedure.

Data Collection. Fifteen minutes of mother-child interaction were audiotaped during each home observation. One or two observers also scored in vivo data on mother and child nonverbal behaviors during these sessions. The audiotapes were then scored for the mother's use of the training techniques and the child's responses to the techniques. Sixteen mother behaviors and seven child behaviors were scored. In addition, mothers were asked to audiotape one 10-minute practice session each week. During the practice sessions, mothers used the trained techniques with their language-delayed children in play interactions similar to those occurring during the home observation sessions. Tapes from the practice sessions were scored for mother use of, and child responses to, the two training procedures (the Model Procedure and the Mand-Model Procedure) that do not involve nonverbal behaviors which must be scored in vivo. In addition to scoring the frequency of the 16 mother behaviors, independent variables will include rate and percent correct use of each training procedure during home observation sessions, two generalization sessions, and three maintenance checks. Dependent variables on changes in child behavior will measure frequency of each child behavior, intelligibility, rate of talking, mean length of utterance, vocabulary growth, and correctness of responding. Both data scored from the audiotapes and analyses of verbatim transcriptions of selected sessions will be used in measuring the dependent variable.

Following the last training condition, a post-treatment language evaluation will be conducted with each child. The tests administered will be identical to those used during the pre-treatment language evaluation. Results of the pre- and post-treatment evaluations will be compared to assess the effects of the intervention on receptive and expressive language skills.

Finally, mothers will complete a Consumer Satisfaction Survey indicating their opinions of the effectiveness and usefulness of the training procedures.

Experimental Design. A multiple-baseline design was used to allow individual analysis of training effects. Each dyad received conditions in the same order: baseline, training of the Model Procedure, training of the Mand-Model Procedure, training of the Delay Procedure, training of the Incidental Teaching Procedure, and follow-up.

Results. Results of the study are presented below as specific descriptions of each dyad's progress to date.

Dyad 1. This mother has completed the training as well as the first of three maintenance sessions. Her son was 3 years old when the study began. Pretreatment evaluation indicated that his receptive language skills were at age level, but he was delayed in his ability to communicate verbally. Furthermore, this child was almost unintelligible. Following seven months of treatment, the child tested one year above age level on standardized tests of receptive and expressive language skills. Results of a test of articulation administered after treatment indicated that the child's articulation skills were within normal limits for his chronological age. His mother, a senior in electrical engineering, learned the techniques quickly, and she applied them proficiently. At the one-month maintenance check, she showed the continued ability to effectively apply the trained techniques. A Consumer Satisfaction Survey completed after treatment indicated that the mother: (1) was satisfied with all aspects of the training, (2) believed the training had resulted in improvement in her son's language skills, and (3) would definitely recommend the program to other parents. When asked her main dissatisfaction with the project, she noted the total length of time involved in training.

Dyad 2. The second mother-child dyad, which started in the project concurrently with the dyad just described, has finished experimental conditions and has completed one of the maintenance checks. The mother, who is a high school graduate, also learned each technique successively and developed increasing skill at applying them in a natural and effective manner. Her son, who was 3½ years when the study began, had adequate receptive language skills, but his expressive skills were about 2 years below age level. His speech was difficult to understand and he rarely spoke in utterances of more than one word. His short attention span and noncompliant behavior made pretreatment administration of standardized tests impossible. During treatment, his frequent displays of inappropriate behavior interfered with the mother's ability to correctly apply the procedures. The child's behavior, and his mother's difficulty in managing it, greatly increased the training time. Progress in the child's language has been made in the areas of frequency of talking, imitation, intelligibility, vocabulary growth, length of utterance, and conversational appropriateness. The training was effective for both mother and child.

Dyads 3 and 4. Both mothers in the second pair of dyads have completed training and are in the maintenance phase. Both mothers are high school graduates with 3-year-old sons. One of the boys is hearing-impaired with a concomitant language delay. The other child's language problem (approximately a one-year delay) is of unknown etiology. Both mothers have learned to apply the therapeutic techniques successfully.

They use them appropriately to build their children's language skills incidentally in naturally occurring situations. Although the hearing-impaired child is still quite delayed, improvements continue to be made in imitation, vocabulary growth, length of utterance, intelligibility, and ability to correctly answer questions. The other child has recently begun to make rapid gains in all areas of language development, and at this time shows little sign of continued language delay.

Dyads 5 and 6. The last two dyads are completing the modeling condition of the study. The boys involved are 2 years, 9 months, and 4 years of age. The younger child is very delayed in his expressive abilities. At this time he uses no intelligible language, although he does try to communicate nonvocally through gestures. The other boy recently arrived in the United States from Thailand and is learning English as a second language. His history of severe health problems in Thailand appear to have contributed to his current problems in learning English. In order to expedite training with the last two dyads, three, as opposed to two, training sessions will be scheduled weekly with these families. Based on the length of treatment for the other four dyads, it is estimated that training of the last two dyads will last from three to four months.

Discussion. The pilot study has provided useful information regarding the duration of training and overall time required for conduct of incidental teaching studies. Training mothers in all four incidental teaching procedures required from 6 to 8 months when two sessions were conducted each week. Collection of data, coding from tapes, and preparation of transcripts required about 10 hours of observer time per dyad, per week. Analysis and graphing of data (which is not computerized in the pilot study) has taken about 4 hours per dyad, per week. The trainer spent an average of four hours with each dyad during the course of a week.

The pilot study has verified the notion that mothers can be trained to be incidental teachers of their children and that they are likely to generalize and maintain their use of techniques to other settings. Training procedures and observation protocols have been developed during the pilot study. Also, the pilot study has drawn attention to some specific variables of incidental teaching which require further analysis and development: assessment of child skills prerequisite to training mothers' generalization and maintenance of this training; qualitative aspects of the teaching procedures; and assessment of changes in children's abilities to learn new linguistic information in informal, conversational settings.

At the completion of the study, a disseminable parent training program will be available in the form of: (1) a manual containing training lectures; (2) handouts for parents; (3) videotapes showing an experienced trainer applying the techniques incidentally with individual children; (4) rules for coding relevant mother and child behaviors; (5) procedures for giving feedback; and (6) criteria for determining mothers' skills in applying the techniques and effects on child behavior.

Implications and Recommendations. Training parents to be incidental teachers of their children is an effective way to alter the interactions between caregivers and their young, handicapped children in a positive way. Changes in language teaching can be achieved by training parents to use four techniques during interactions with their child. Adapting these techniques to fit the particular skills of the child requires a skilled trainer with a substantial knowledge of children's language development and of behavior-change techniques. It is important to develop the procedures investigated in the current study into fully reliable and replicable packages that can be applied to parents and children exhibiting a variety of language problems. Assessment protocols and criteria for parent and child performance should be included in these procedures. It is similarly important to develop specific procedures for training new parent trainers to train other parents.

The primary criticism of many language intervention techniques is that they do not produce generalized and readily maintained effects. While training may promote acquisition of new responses during the training session, the child does not use these responses in other settings with other people to express new communication intentions. Training parents as incidental teachers may have some unique advantages in terms of maintenance and generalization of child skills, since the training occurs in the context of functional, naturalistic interactions. The assessment of the long-term generalization and maintenance (by both parent and child) resulting from incidental training should be a primary target for future research. It is likely that specific techniques to facilitate parent maintenance of teaching will be needed and efforts should be directed toward developing such procedures. Finally, incidental teaching may be a means for teaching handicapped children strategies for learning language from naturalistic interactions. Divising a probe strategy to determine if this is the case and altering the paradigm to insure acquisition of strategy as well as linguistic content, would be a next important step in developing these procedures for widespread use.

## 2) CHILD-CHILD

The following section describes the studies examining the social skills and patterns of interaction among handicapped and nonhandicapped children. This series of investigations, when considered with those proposed in the two subsequent sections (child-teacher and child-setting) was designed to provide a description of the ecology of the preschool classroom and its essential components: The child and the child skills, the teacher and the teacher's behavior, and the setting itself.

### ECOLOGICAL GUIDES TO INTERVENTION

### QUESTION C: WHAT SOCIAL VARIABLES AFFECT THE SOCIAL AND PLAY BEHAVIORS OF HANDICAPPED AND NONHANDICAPPED CHILDREN IN AN INTEGRATED CLASSROOM? (Investigator: Peterson)

Concurrent with the growth of early intervention programs for handicapped children has been a growing concern about the type of educational environments in which children are placed for special services. This concern has been focused largely upon placement issues related to the school-aged handicapped child. It has resulted in a major movement away from wide scale placement of mildly handicapped children into segregated special education classrooms. This educational trend was given an even stronger impetus with the legislative endorsement of that concept through Public Law 94-142. Under the provisions of that law, placement of handicapped children for special education services must be within the "least restrictive environment."

Although the mainstreaming movement has been focused largely upon school-aged children, its influence has extended downward to preschool programs serving handicapped children. As a result of the proliferation of this concept into early childhood education, two service delivery models have emerged. Each of these models provides a different method for ensuring that handicapped children are served within settings that include normal or nonhandicapped children. The more familiar "mainstreaming model" provides for the inclusion of a few handicapped children in preschool programs that serve a normal majority. Some adaptations or modifications are made in the educational environment or activity program to accomodate the handicapped child in that setting. The second model is often referred to as an "integration model." This approach provides for the inclusion of nonhandicapped children in programs that are, in most cases, initially designed to serve handicapped children. In the former model, handicapped children constitute a very small minority (usually 10-20%). In this latter model, ratios typically are more balanced, although normal children are usually the minority in the classroom (usually 30-50%).

A major premise underlying each of these emerging models is that handicapped preschool children will profit from exposure to nonhandicapped children. It is also assumed that if the two groups of children are placed in the same preschool environment, they will indeed interact with one another. Mainstreaming presumes that physical integration will result in social integration and that children will not resegregate themselves through

# PROGRESS CHART FOR RESEARCH STUDIES

## ECOLOGICAL GUIDES TO INTERVENTION

■ Activities Completed
◢ Activities in Progress
▨ Activities Projected
═ Studies Repeated
NA Not Applicable

| | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | [illegible]ITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PETERSON** | | | | | | | | | | | |
| 5. PLAY INTERACTIONS ACROSS PRESCHOOL SETTINGS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 6A. RELATIONSHIP BETWEEN PLAY AREA AND INTERACTIONS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 6B. COMPARISON OF CLASSROOM AND PLAYGROUND SOCIAL INTERACTIONS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 7. CHILD VARIABLES AFFECTING INTERACTION | | CANCELLED | | | | | | | | | |
| 8. PROCEDURES FOR SOCIAL INTERACTIONS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

FIGURE 18

their own playmate selections and social play behavior. Furthermore, it is also assumed that, given the opportunity for handicapped and nonhandicapped youngsters to interact, the handicapped ones will observe, imitate, and learn from their normal peers. It is important to recognize that these premises upon which mainstreaming is built (in part) are assumptions, not established fact. They are assumptions that must be submitted to empirical study before the true effects of integrating handicapped and nonhandicapped children (especially at the preschool level) can be known.

Specific research examining the social interactions among handicapped and nonhandicapped children in integrated and mainstreamed settings has been limited. Only during the past 4-5 years has empirical literature begun to appear on social interactions and play among integrated groups of preschoolers. That literature basically is of three types: (1) literature that has examined social and play interactions in regard to the frequency of type of social contact between handicapped and nonhandicapped children (Guralnick, 1980; Peterson & Haralick, 1977; Ispa & Matz, 1978; Fredericks, et al., 1978) and (2) literature that has examined modeling and imitation that occurs between the two groups of children, and (3) literature that describes intervention strategies for increasing the frequency of social contact or the quality of interactions between the handicapped and nonhandicapped peers. Much of the research in the latter two categories has focused upon the use of modeling under nonstructured and structured learning situations as a means for eliciting more prosocial behavior in handicapped children (e.g., Apolloni, Cooke, & Cooke, 1977; Devony, Guralnick, & Rubin, 1974; Guralnick, 1976, 1978).

The use of peer mediated tactics as a means for enhancing integration of handicapped and nonhandicapped classmates also has begun to appear in research literature (Strain, 1977; Strain, Kerr, & Ragland, 1979). Research on social interactions among handicapped and nonhandicapped children in integrated and mainstreamed settings thus far does not suggest that handicapped children are outwardly rejected. However, neither do the data totally support the notion that handicapped children are active participants in classroom activities in the same way that their more normal counterparts are involved. There is growing evidence that there may be some preferential tendencies for nonhandicapped children to seek out certain types of playmates for more complex kinds of activities.

A considerable amount of research is still needed to understand the social dynamics within integrated and mainstreamed preschool settings, including the degree to which handicapped and nonhandicapped peers actually play and associate with one another. Given such information, the need for teacher initiated or environmental interventions to enhance true integration of the two groups will become more clear. Research is needed to examine the assumptions described previously to determine whether they are valid or not. If social integration does not occur spontaneously in integrated environments, or if the anticipated outcomes do not necessarily occur under such models, then questions emerge as to whether manipulation of teaching methods can bring about the desired results. In short, there are a large number of practical questions concerning early education environments that must be submitted to empirical study. These questions are especially important to the integration of handicapped and nonhandicapped children since they relate to some critical components that are presumed to be critical to the social ecology of mainstreamed settings.

In keeping with the major goals of the University of Kansas Early Childhood Research Institute, the research described here had four major purposes:

1. To document and describe the nature of social interaction and play behavior of young handicapped children in integrated preschool environments. (Emphasis was placed upon free play, nonstructured activities typical of early childhood service settings where children are free to select playmates and engage in their own preferred form of play behavior).

2. To examine the consistency with which patterns of social/play behaviors among handicapped and nonhandicapped are shown among groups of children in different integrated preschool settings.

3. To compare social integration and play behavior of handicapped and nonhandicapped classmates (a) across specific play areas in the classroom environment where selected types of toys/equipment are available and (b) between classroom and playground settings.

4. To begin pilot research on intervention strategies applicable with preschool settings that can be used to increase social contact between handicapped and nonhandicapped peers. The focus of intervention and the experimental strategies were to be derivatives of the descriptive research defined in the previous statements of purpose.

To achieve the ends just outlines, this project encompassed two major phases of research: Major emphasis was placed upon Phase 1 and the development of a strong base of descriptive/normative data.

Phase 1 - This involved a series of descriptive studies designed to gather descriptive/normative data on social interaction and play behavior of handicapped and nonhandicapped children across several different settings and preschool classes. Data were collected on 10 cohorts of preschool children. This included a total of 40 handicapped subjects and 33 nonhandicapped subjects. Due to the variability of play behavior characterizing young children and the complex nature of this research, data were collected on each subject for extended periods of time (8-15 weeks). This produced approximately 2200 units of data per subject weekly. Using an estimate of approximately 10 weeks of data per subject for 73 subjects, some 1,606,000 units of observational data were collected during this phase. All data were input into the computer, checked for errors, corrected, and reverified. Summary data tables were prepared, checked for errors, corrected and rerun and then descriptive and statistical analyses were conducted on the data.

Phase 2 - This involved a pilot study on a teacher mediated intervention procedure for (a) increasing rates of social interaction between handicapped and nonhandicapped peers, and (b) increasing rates and quality of play behavior among selected children in one class. Intervention was designed to examine the effects of training on social behavior among both handicapped and nonhandicapped subjects.

Brief descriptions are given for each of the four broad studies and their substudies conducted by Peterson. More detailed manuscripts are in preparation on these studies. Because of the complexity of the data collected and the variables and subvariables being examined, all statistical analyses are not reported here. Further post hoc analyses are being made for data being prepared for publication.

## STUDY 5: SOCIAL AND PLAY INTERACTIONS WITHIN SEVERAL PRESCHOOL SETTINGS

This research was comprised of 3 sub-studies which are described below as Studies 5A, 5B, and 5C.

## STUDY 5A: CONSISTENCY OF SOCIAL INTERACTION AMONG HANDICAPPED AND NONHANDICAPPED PRESCHOOL GROUPS ACROSS VARIOUS PRESCHOOL GROUPS

(PI's: Peterson, Carta, & Pitts)

Studies of social interaction among young children within naturalistic preschool environments present a number of difficult methodological problems. First, preschool classrooms typically contain only a very small number of children (approximately 8-12). Classroom enrollments are even more restricted when handicapped children are included, especially the moderately and severely disabled. The limitations of small subject samples in research are well known. The presence of uncontrolled intervening variables when studies are conducted with small and perhaps idiosyncratic subject groups and in settings quite unlike that of a controlled laboratory are typical problems that plague applied researchers. Furthermore, because young children differ considerably in their social and developmental characteristics, findings on a group of children in one preschool setting may not be very generalizable to another setting. Whether patterns of social interaction found among one group are consistent with those exhibited among different cohorts of children or across different preschool settings is an empirical question and one needing research. Yet if the objective is to conduct observational research of children in their naturalistic settings, one is obligated to contend with such small numbers and attempt to validate findings by replicating across sites. The alternative of creating a larger subject population by combining data on children from several different preschool settings in order to increase the _n_ for statistical analyses creates equally perplexing methodological issues. A myriad of uncontrolled variables applied differentially across sites are introduced, which may make interpretation of data equally different. Differences in the physical size and layout of classrooms, in the types and amount of play equipment/materials available, and differences in teaching styles of staff are all known to affect the nature of social interaction among children. Thus researchers are faced with the choice of accepting the limitations of a small number of subjects and using greater caution in generalizing results _or_ combining data across classes to achieve a larger subject population but thereby pooling data from very different social/ecological settings that may not be particularly compatible. There is no easy methodological solution to such problems. Perhaps this suggests a need for more creative, flexible approaches to naturalistic research. It also stresses the importance of replication across sites of single classroom studies that involve a small number of children to determine if findings in one site are compatible with those in other similar sites.

Purpose. The purpose of this study was to determine the degree to which social interaction patterns and play behavior among integrated handicapped and nonhandicapped children are consistent across different classroom groups. Data were gathered on seven different cohorts of handicapped and nonhandicapped children who were enrolled in integrated (or reverse-mainstreamed) preschool classrooms to examine the following vriables: (a) frequency and type of play behavior exhibited by H and NH subjects (overall, in various play areas, and with various playmate types), (b) frequency and type of social interactions with H and NH classmates, (c) playmate selections given certain availability conditions that occurred spontaneously in the free play environment, and (d) social clustering of children in the various play areas of the preschool classroom that affected who was in proximity to the observed subjects and hence available to them for social interaction.

Subjects/Settings. Each cohort represented in the subject pool for this study represented a different class group of integrated handicapped and nonhandicapped children. In general, each cohort encompassed approximately four handicapped and four nonhandicapped subjects and each subgroup included approximately two males and two females. A break down of subject characteristics is shown in Table 7.1.

In order to standardize the environmental settings across cohorts for purposes of minimizing uncontrolled intervening variables, several steps were taken prior to data collection. First, classrooms were organized into specifically defined play/learning areas typical to those found in most early childhood environments. Clear boundaries obvious to both children and teachers were defined via furniture/portable dividers, or lines drawn with tape and specific types of play material/equipment were designated for each area. This standardization was made because the nature of toys and learning materials available to children are known to affect their social interactions and play behavior. The six play areas were specified and then schedules were set so that on any given day, three play areas were accessible to the children (thus play areas are clustered into "rotation 1" areas and "rotation 2" areas). Areas included:

1. Playhouse or kitchen area - included child size housekeeping furniture, dolls, tea sets and pans, plastic fruits and vegetables, dress-up clothes, etc.

2. P.E. or gross motor area - included indoor-outdoor play equipment such as a slide, rocking boat, rocking horse, hollow balls, a cloth tunnel, etc.

3. Art or creative play table - included such creative/art materials as paper and crayons, paints, clay, materials for art activities, etc.

4. Table work/Preacademic Table - included academically or skill oriented materials such as puzzles, parquetry cubes and cards, sorting-matching materials, lotto cards, academic games, etc.

5. Manipulative Floor Play area - included construction/manipulation types of toys such as wooden building blocks, cars and trucks, plastic animals, large and small tinker toys, miniature houses and people.

6. Free Choice or quiet area - included an assortment of play items such as books, puppets, flannel board with story book felt figures, busy boxes, and other "look-at" items.

7. Miscellaneous area - included the space between formally designated play areas where children could move to engage in their own forms of self initiated play without any specific play materials from the other defined play areas.

A second method for standardizing environments was to define teacher roles and responsibilities during the free play time. Previous pilot studies conducted by the investigator had indicated that teacher behavior and reinforcement particularly affected children's interaction patterns. Since the study was designed to examine the spontaneous play and social interactions between handicapped and nonhandicapped children, the following procedures were outlined to minimize the effects of teacher interaction with children during the free play sessions. First, three teachers were always present in the classroom during the free play sessions. Two of the teachers were assigned to one of the three play areas (usually one in which children might need assistance or supervision). The third teacher served as a "rover" and supervisor of the entire classroom. Second, rates of teacher/child interactions or reinforcement were standardized so that teachers interacted with children at a rate of 3-5 times per 5 minutes or approximately one interaction each 1-1½ minutes. Teachers were instructed to allow children to engage in spontaneous free play and to avoid manipulating or controlling a child's play activities. They were to reinforce only good play behavior, assist a child in choosing an activity if the child was unengaged, and intervene only if a child needed immediate help for some reason. Teachers were specifically instructed to allow children a free choice of play area and of playmate. Interactions were to be brief and dispensed across all children.

Experimental Design/Data Collection Procedures. This research was designed as a descriptive study to investigate children's spontaneous social and play behavior in the naturalistic classroom environment. Consequently, no experimental conditions were created and no manipulations were made. The study involved continuous daily observation of selected subjects during the free play time in their classroom. This was a regularly scheduled activity that occurred during each morning, shortly after the children's arrival at their preschool center. Free play consisted of a 30 minute time period when children were allowed to choose their own play activity and playmates and were allowed to move about the classroom freely.

Observations data were collected daily using a time-sampling observation code (Peterson Preschool Observation System for Social Interaction, 1978) which was designed for studying social interactions between integrated gorups of children. The observation code allows for recording of play and interactional variables on the basis of 30 second time intervals. Data were collected on a complex array of data including:

1. the play area in which the subject was located

2. a count of handicapped and nonhandicapped peers and teachers who were actually available within the same play area in which the observed child was engaged. This allowed for the categorization of available playmates as handicapped only nonhandicapped only, or combination of handicapped and nonhandicapped.

3. a designation of the type of play in which the observed child was engaged. This included no play, isolate or independent play, associative/parallel play, and cooperative play (which was broken down into three basic types -- physical cooperative, instructional cooperative, and general cooperative).

4. a designation of the type of child or children with whom the observed subject interacted during a given 30 second observation interval. This included no interaction, interaction with a handicapped peer(s), interaction with nonhandicapped peer(s), or interaction with combination of handicapped and nonhandicapped peers. An actual count was taken of children under each categorical division of children with whom a subject could interact.

5. a designation of "time-out" intervals. This included any event which temporarily removed a child from availability for play, such as leaving the room for any reason, getting a drink, going to the lavatory, any time-out or punishment procedure or any teacher action which rendered a child inaccessible for interaction with other children.

All data clerks who collected data in each of the seven research classrooms were trained for several weeks prior to data collection. Training continued until all data clerks reached the criterion of 85% reliability and maintained this consistently for 4 days. Continuous reliability checks were made throughout the study at all sites, 2-3 days per week on each data clerk. Reliability was maintained throughout all studies at 85% or above; average reliability for data clerks on each cohort ranged from 90-100%.

Data on each subject within each cohort was collected daily for approximately 8-12 weeks during a 30 minute free play time. During any given day, each data clerk took data on two subjects. The procedure involved the collection of data on one subject for 5 minutes using the 30 second observation intervals. The data clerk then switched to a second subject for 5 minutes, returned to the first subject for 5 minutes, and so forth. Thus, daily data on each subject consisted of two, five minute samples of play and social interaction. Observation schedules were created so that data clerks rotated through all subjects and to allow reliability checks to be made between all combinations of data clerks in a given classroom setting.

Results. The purpose of this study was to investigate the consistency with which play behaviors and interactional patterns among handicapped and nonhandicapped preschoolers are consistent across several different classroom groups (or cohorts) of children. Because the number of handicapped and nonhandicapped subjects within each cohort was so small, statistical tests were of insufficient power to warrant their use to see if significant differences existed between cohorts. Therefore, data were prepared by computing cohort means and standard deviations for each variable by play area and then totaled across play areas. These computations were made for the handicapped subjects within each cohort and for the nonhandicapped subjects within each cohort. By inspection and visual comparison of these descriptive measures, a perspective can be obtained of the consistency of subject behavior across cohorts. All tables and analyses are not included in this summary since they are so numerous. General results are summarized below.

1. Consistency in play areas frequented by handicapped and nonhandicapped children across cohorts.

   Descriptive data summarized in Table 7.2 show the mean percent of time spent by subject groups in each of the classroom play areas. Inspection of means for handicapped subjects across each play area shows some variation across cohorts. These variations, however, are rather close to the overall population mean for all cohorts (not shown here in the tables). Cohort means appear to be relatively evenly distributed around the grand mean for all cohorts. That is, the proportion of time spent by subjects in each cohort does not appear to be distinctly discrepant from the others. Similar patterns are shown for both handicapped and nonhandicapped subjects.

2. Playmate availability to subjects within areas.

   The social clustering of handicapped and nonhandicapped children within play areas in each of the cohorts is summarized in Table 7.3. Playmate availability refers to what playmate types were available to the observed subjects in the various play areas where they played during any given observation interval. Social clustering as it occurred spontaneously within each classroom cohort would, of course, affect the opportunities H and NH subjects would have to interact with peers and to engage in certain forms of prosocial behavior. By inspection of that table, no one cohort stands out as distinctly different from the others. This was true for both handicapped and nonhandicapped subjects.

3. Type of play exhibited by handicapped and nonhandicapped subjects.

   Inspection of the mean percentages for each type of play by handicapped subjects across areas or by nonhandicapped subjects shows considerable similarity in the amount of no play/parallel, or solitary play exhibited. This would suggest that subjects were indeed similar in the form of play in which they engaged even though they were part of different classroom groups. (See Table 7.4).

4. Playmate selections.

Some variability is shown in playmate selections on the various playmate options across subjects in the various cohorts. Yet at the same time, percentages appear somewhat normally distributed. Since this is the major variable being studied, the environmental and child characteristics affecting playmate selections would likely produce some variation here that would not necessarily suggest that one cohort is drastically different from another. Differences are not so great that one could conclude that any one cohort was distinctly different from the other six. (See Table 7.5A and 7.5B)

5. Peer Interactions.

Tables 7.6A and 7.6B summarize the isolate/nonisolate play exhibited by subjects across the various cohorts. By looking at the total figures for each cohort at the bottom of the tables, the same general patterns of peer interactions are apparent. Subjects (both handicapped and nonhandicapped) engaged in similar proportions of no play, isolate play, and nonisolate play.

Discussion/Summary. Only a small part of rather extensive data and data analyses on this study have been presented in the summary above. Given the data shown here and other analyses that have been made on this data, it appears that the seven cohorts were quite similar in type of play and general interactional patterns. There were none so distinctly different that one might question its inclusion as a subpart of a population of integrated handicapped/nonhandicapped children. This evidence may suggest (at least for these 7 cohorts), that if integrated sites are carefully selected and standardized in some ways to minimize environmental variations, that subjects across different social groups can be combined for group analyses on the social integration of the handicapped and nonhandicapped peers in each environment. If it is indeed legitimate to combine such groups to create large subject groups, more sophisticated statistical analyses may be applied to analyze data to circumvent the problems of the small numbers of subjects typically available in only one classroom setting.

## Table 7.1

### Description of Subject Characteristics Within Each Cohort

| | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 | Cohort 5 | Cohort 6 | Cohort 7 | Total (All Cohorts) |
|---|---|---|---|---|---|---|---|---|
| HANDICAPPED SUBJECTS CHARACTERISTICS | | | | | | | | |
| Number of Handicapped Subjects | 3 | 6 | 5 | 4 | 4 | 4 | 7 | 33 |
| Sex | | | | | | | | |
| Male | 1 | 3 | 0 | 2 | 2 | 2 | 4 | 14 |
| Female | 2 | 3 | 5 | 2 | 2 | 2 | 3 | 19 |
| Mean Age | 3.10 | 6.3 | 5.0 | 5.8 | 5.10 | 4.0 | 3.9 | 5.0 |
| Range of Ages | 3.4-3.11 | 4.9-8.5 | 4.5-5.9 | 4.8-7.2 | 5.1-6.6 | 2.10-5.8 | 2.6-6.1 | |
| Major Handicapping Condition | | | | | | | | |
| MR - Down's Syndrome | 0 | 1 | 2 | 3 | 4 | 1 | 3 | 14 |
| Cognitive Disabilities | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Physical/Neurological Disabilities | 1 | 1 | 1 | 0 | 0 | 2 | 2 | 7 |
| Sensory Impairments | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| Developmental Delay | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 4 |
| Speech/Language | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 5 |
| Severity Level of Major Disability | | | | | | | | |
| Mild | 1 | 4 | 1 | 3 | 2 | 1 | 1 | 13 |
| Moderate | 2 | 0 | 3 | 1 | 2 | 2 | 4 | 14 |
| Severe | 0 | 2 | 1 | 0 | 0 | 1 | 2 | 6 |
| NONHANDICAPPED SUBJECTS | | | | | | | | |
| Number of Nonhandicapped Subjects | 3 | 4 | 3 | 5 | 4 | 4 | 5 | 28 |
| Sex | | | | | | | | |
| Male | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 14 |
| Female | 1 | 3 | 1 | 3 | 2 | 2 | 2 | 14 |
| Mean Age | 3.11 | 3.11 | 4.4 | 4.6 | 4.11 | 3.6 | 3.11 | 4.2 |
| Range of Ages | 3.0-4.5 | 3.6-4.3 | 4.1-4.7 | 4.1-5.0 | 4.6-5.7 | 2.5-4.6 | 2.10-4.11 | |

## Table 7.2

### PLAY AREAS WHERE HANDICAPPED AND NONHANDICAPPED CHILDREN WITHIN EACH COHORT SPENT THEIR TIME IN CLASSROOM FREE PLAY AREAS

| | COHORT 1 (SP 79 KC) | | COHORT 2 (SP 79 H) | | COHORT 3 (SU 79 H) | | COHORT 4 (F 79 H) | | COHORT 5 (SP 80 H) | | COHORT 6 (F 80 H-1) | | COHORT 7 (SP 80-H-B) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. |
| KITCHEN AREA | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 18.90 | 16.88 | 9.61 | 5.53 | 6.30 | 5.85 | 15.82 | 12.31 | 13.87 | 6.68 | 22.80 | 8.50 | 16.18 | 5.06 |
| NONHANDICAPPED SUBJECTS | 18.23 | 2.74 | 10.79 | 4.81 | 13.65 | 3.22 | 18.23 | 7.42 | 11.26 | 4.34 | 17.01 | 4.78 | 17.47 | 7.99 |
| P.E. AREA | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 6.68 | 2.26 | 12.96 | 3.45 | 8.98 | 5.34 | 12.55 | 8.05 | 18.44 | 13.67 | 10.73 | 4.05 | 14.16 | 7.33 |
| NONHANDICAPPED SUBJECTS | 12.42 | 10.13 | 10.31 | 4.50 | 19.95 | .63 | 16.69 | 10.09 | 21.97 | 14.91 | 17.83 | 10.01 | 13.96 | 4.46 |
| ART AREA | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 16.71 | 11.14 | 24.95 | 9.11 | 32.70 | 16.02 | 18.52 | 15.03 | 18.76 | 8.80 | 15.36 | 8.30 | 16.60 | 10.34 |
| NONHANDICAPPED SUBJECTS | 10.39 | 7.79 | 23.43 | 8.46 | 9.81 | 4.32 | 20.96 | 7.08 | 14.10 | 8.56 | 13.00 | 4.47 | 14.74 | 3.66 |
| TABLEWORK AREA | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 11.82 | 7.35 | 19.33 | 10.87 | 31.37 | 3.39 | 19.81 | 17.32 | 17.41 | 16.86 | 14.17 | 10.29 | 16.66 | 5.96 |
| NONHANDICAPPED SUBJECTS | 19.55 | 13.67 | 22.63 | 3.82 | 13.62 | 9.12 | 14.85 | 6.32 | 12.20 | 1.73 | 15.25 | 10.96 | 16.07 | 8.25 |
| MANIPULATIVE FLOOR PLAY | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 34.18 | 5.41 | 12.69 | 12.20 | 7.83 | 3.55 | 21.50 | 14.92 | 13.72 | 13.27 | 21.55 | 15.13 | 21.03 | 4.87 |
| NONHANDICAPPED SUBJECTS | 24.55 | 9.52 | 10.03 | 2.07 | 31.12 | 7.94 | 19.31 | 8.03 | 19.72 | 8.14 | 23.18 | 10.30 | 20.70 | 8.74 |
| FREE CHOICE AREA | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 6.26 | 2.39 | 14.84 | 4.84 | 8.34 | 5.19 | 7.54 | 4.99 | 12.59 | 2.38 | 11.71 | 7.32 | 10.45 | 4.26 |
| NONHANDICAPPED SUBJECTS | 9.51 | 3.02 | 17.50 | 4.39 | 10.00 | 4.21 | 10.32 | 6.75 | 15.12 | 7.98 | 9.34 | 2.44 | 13.51 | 3.87 |
| MISC. AREA | | | | | | | | | | | | | | |
| HANDICAPPED SUBJECTS | 5.46 | .99 | 5.99 | 2.64 | 4.46 | 3.10 | 4.25 | 3.24 | 5.22 | 9.91 | 3.68 | 2.40 | 4.92 | 2.61 |
| NONHANDICAPPED SUBJECTS | 5.36 | 1.14 | 5.30 | .51 | 1.96 | .91 | 3.63 | 2.38 | 5.85 | 3.94 | 3.85 | 1.89 | 3.76 | 1.36 |

## Table 7.3

### Type of Play Exhibited by Handicapped and Nonhandicapped Children Across Cohorts

-- Classroom --

| | Cohort 1<br>(Sp 79 KC) | | Cohort 2<br>(Sp 79 H) | | Cohort 3<br>(Su 79 H) | | Cohort 4<br>(F 79 H) | | Cohort 5<br>(Sp 80 H) | | Cohort 6<br>(F 80 H-1) | | Cohort 7<br>(Sp 81 HB) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. |
| Handicapped Subjects | | | | | | | | | | | | | | |
| No Play | 33.84 | 9.14 | 35.19 | 7.38 | 35.33 | 6.75 | 29.75 | 7.69 | 27.70 | 5.48 | 24.44 | 1.39 | 30.83 | 5.59 |
| Solitary Play | 24.32 | 7.71 | 34.44 | 5.00 | 24.56 | 3.68 | 35.02 | 6.71 | 43.93 | 2.61 | 41.82 | 3.22 | 37.52 | 9.60 |
| Parallel Play | 39.13 | 2.02 | 27.70 | 7.46 | 36.56 | 6.98 | 33.04 | 3.94 | 31.19 | 3.03 | 32.72 | 3.06 | 29.75 | 8.66 |
| Cooperative Play | 2.50 | 3.86 | 2.66 | 2.12 | 3.48 | 2.74 | 2.17 | 1.31 | 3.16 | 2.89 | 1.03 | .69 | 1.89 | 1.25 |
| Nonhandicapped Subjects | | | | | | | | | | | | | | |
| No Play | 25.27 | 1.63 | 25.41 | 3.22 | 24.96 | 8.72 | 24.20 | 8.76 | 22.42 | 3.89 | 19.36 | 3.64 | 23.07 | 1.48 |
| Solitary Play | 23.19 | 5.64 | 19.17 | 6.10 | 22.81 | 9.46 | 20.91 | 12.63 | 29.41 | 15.78 | 34.71 | 5.26 | 39.60 | 4.33 |
| Parallel Play | 47.55 | 2.62 | 49.74 | 4.97 | 45.09 | 8.57 | 48.65 | 9.96 | 45.37 | 11.90 | 43.18 | 4.81 | 35.17 | 4.69 |
| Cooperative Play | 3.49 | 2.30 | 5.72 | 1.11 | 7.17 | 3.48 | 6.20 | 1.64 | 3.85 | 3.69 | 3.00 | 1.79 | 2.14 | 1.53 |

T-1A3C

# Table 7.4

## Types of Playmates Available in Areas Where Handicapped and Nonhandicapped Subjects Spent Their Time During Free Play

### Handicapped Subjects

| | Cohort 1 (Sp 79 KC) | | Cohort 2 (Sp 79 H) | | Cohort 3 (Su 79 H) | | Cohort 4 (F 79 H) | | Cohort 5 (Sp 80 H) | | Cohort 6 (F 80 H-J) | | Cohort 7 (Sp 81 HE) | | Total Across Cohorts | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. |
| **ROTATION 1** | | | | | | | | | | | | | | | | |
| Playhouse Area | | | | | | | | | | | | | | | | |
| Handicapped Only | 9.97 | 8.70 | 37.26 | 13.13 | 17.77 | 19.01 | 3.81 | 3.87 | 27.74 | 15.37 | 32.27 | 7.15 | 29.50 | 13.28 | 22.57 | 15.98 |
| Nonhandicapped Only | 13.50 | 15.58 | 3.96 | 4.04 | .68 | 1.35 | 4.27 | 4.88 | 14.98 | 10.40 | 6.07 | 5.93 | 10.24 | 8.72 | 7.59 | 9.76 |
| Combination | 65.74 | 29.80 | 49.62 | 18.50 | 78.53 | 17.15 | 86.31 | 14.30 | 45.23 | 8.96 | 54.29 | 8.08 | 65.19 | 7.53 | 62.79 | 19.56 |
| No One | 10.79 | 11.36 | 9.33 | 6.07 | 2.86 | 2.35 | 5.69 | 5.84 | 12.05 | 6.09 | 7.36 | 3.71 | 4.05 | 3.87 | 7.13 | 6.15 |
| P.E. Area | | | | | | | | | | | | | | | | |
| Handicapped Only | 1.48 | 2.56 | 30.29 | 22.72 | 12.37 | 7.37 | 13.03 | 6.78 | 9.86 | 2.77 | 15.03 | 7.92 | 13.78 | 6.79 | 15.04 | 13.13 |
| Nonhandicapped Only | 10.90 | 9.59 | 12.29 | 9.33 | 30.51 | 20.96 | 12.65 | 12.04 | 11.93 | 8.48 | 12.11 | 9.26 | 9.43 | 6.41 | 14.30 | 13.30 |
| Combination | 84.79 | 12.99 | 48.40 | 13.43 | 55.47 | 23.83 | 69.35 | 16.43 | 72.18 | 8.21 | 68.42 | 10.44 | 71.04 | 10.86 | 65.43 | 17.11 |
| No One | 2.82 | 3.17 | 9.01 | 9.51 | 1.64 | 2.34 | 4.96 | 1.66 | 6.01 | 4.43 | 4.45 | 5.08 | 5.73 | 5.08 | 5.23 | 5.50 |
| Art Area | | | | | | | | | | | | | | | | |
| Handicapped Only | 10.45 | 8.92 | 15.02 | 5.76 | 31.29 | 11.34 | 10.68 | 11.94 | 30.37 | 2.68 | 28.77 | 2.93 | 25.93 | 17.17 | 22.36 | 12.80 |
| Nonhandicapped Only | 3.81 | 4.57 | 13.03 | 6.93 | 11.17 | 19.96 | 12.76 | 9.43 | 10.57 | 13.94 | 21.36 | 8.90 | 12.22 | 9.84 | 12.42 | 9.68 |
| Combination | 64.88 | 24.39 | 61.14 | 15.59 | 53.18 | 29.87 | 71.98 | 17.67 | 46.64 | 14.91 | 33.01 | 12.51 | 42.41 | 25.59 | 52.45 | 21.61 |
| No One | 21.05 | 36.46 | 10.80 | 4.89 | 4.34 | 3.56 | 4.57 | 1.15 | 12.48 | 9.29 | 16.83 | 7.62 | 19.42 | 10.04 | 12.76 | 12.68 |
| Misc. Act. 1 | | | | | | | | | | | | | | | | |
| Handicapped Only | -0- | -0- | 6.67 | 7.64 | 9.32 | 6.93 | 5.65 | 11.29 | 4.63 | 9.26 | 25.48 | 36.26 | 2.95 | 5.33 | 7.53 | 14.63 |
| Nonhandicapped Only | 9.26 | 16.03 | 3.16 | 3.30 | 1.19 | 2.34 | -0- | -0- | 1.85 | 3.70 | 2.08 | 4.17 | 6.56 | 9.76 | 3.54 | 7.01 |
| Combination | 10.46 | 5.57 | 2.21 | 3.66 | -0- | -0- | 6.76 | 7.22 | 3.70 | 7.41 | -0- | -0- | 1.92 | 2.79 | 2.92 | [illegible] |
| No One | 81.94 | 22.37 | 87.95 | 11.43 | 89.49 | 7.37 | 87.59 | 11.25 | 89.81 | 20.38 | 72.43 | 36.47 | 89.75 | 9.53 | 86.22 | 17.08 |
| **ROTATION 2** | | | | | | | | | | | | | | | | |
| Table Work Area | | | | | | | | | | | | | | | | |
| Handicapped Only | -0- | -0- | 22.58 | 13.27 | 26.88 | 9.19 | 31.19 | 11.48 | 17.24 | 8.83 | 11.17 | 9.75 | 37.79 | 22.15 | 23.61 | 17.18 |
| Nonhandicapped Only | 38.22 | 30.15 | 19.14 | 10.53 | 13.40 | 3.10 | 14.19 | 10.43 | 14.43 | 16.58 | 23.32 | 18.53 | 11.55 | 8.02 | 16.33 | 14.71 |
| Combination | 57.85 | 26.43 | 48.92 | 26.65 | 52.11 | 16.44 | 39.09 | 10.31 | 53.20 | 37.68 | 55.13 | 16.73 | 40.65 | 21.15 | [illegible] | 21.35 |
| No One | 3.92 | 3.96 | 9.34 | 5.26 | 7.60 | 4.17 | 11.56 | 8.60 | 15.11 | 14.65 | 10.37 | 5.61 | 9.98 | 9.04 | 9.65 | 7.48 |
| Manipulative Floor Play | | | | | | | | | | | | | | | | |
| Handicapped Only | 11.50 | 7.15 | 23.69 | 20.18 | 1.70 | 3.41 | 7.47 | 7.23 | 18.46 | 13.00 | 11.98 | 12.27 | 7.89 | 7.10 | 12.79 | 13.88 |
| Nonhandicapped Only | 2.95 | 2.59 | 4.14 | 4.04 | 2.00 | 4.47 | 8.46 | 2.29 | 16.81 | 19.58 | 4.45 | 4.13 | 5.13 | 4.83 | 6.04 | 8.25 |
| Combination | 84.91 | 5.67 | 62.61 | 22.96 | 96.30 | 5.10 | 83.09 | 7.56 | 52.35 | 18.78 | 83.24 | 16.51 | 84.19 | 8.51 | 78.04 | 19.96 |
| No One | 0.61 | 0.58 | 9.55 | 5.80 | -0- | -0- | 0.96 | 1.63 | 12.37 | 14.05 | 0.33 | 0.66 | 2.77 | 3.82 | 3.13 | 6.45 |
| Free Choice Area | | | | | | | | | | | | | | | | |
| Handicapped Only | 1.77 | 1.54 | 17.49 | 12.46 | 20.96 | 15.20 | 12.96 | 9.00 | 32.27 | 26.82 | 37.50 | 29.68 | 17.27 | 13.57 | 20.19 | 17.39 |
| Nonhandicapped Only | 22.92 | 23.92 | 8.75 | 7.13 | 9.82 | 8.43 | 13.35 | 6.18 | 10.42 | 5.70 | 2.71 | 1.93 | 12.80 | 11.83 | 11.19 | 19.58 |
| Combination | 68.23 | 15.27 | 64.75 | 26.31 | 65.54 | 21.11 | 54.11 | 10.21 | 40.85 | 20.49 | 49.28 | 23.66 | 58.65 | 10.97 | 57.79 | 20.51 |
| No One | 7.07 | 12.25 | 9.00 | 8.64 | 3.66 | 3.10 | 14.28 | 12.60 | 16.41 | 9.44 | 10.50 | 11.09 | 11.25 | 12.47 | 10.92 | 12.42 |
| Misc. Act. 2 | | | | | | | | | | | | | | | | |
| Handicapped Only | -0- | -0- | 5.02 | 4.63 | 4.89 | 6.74 | 13.69 | 21.74 | 20.29 | 24.16 | 4.44 | 7.78 | 6.67 | 5.17 | 7.83 | 12.46 |
| Nonhandicapped Only | 2.56 | 4.44 | 2.49 | 4.49 | 5.33 | 8.69 | 6.96 | 6.45 | 3.26 | 6.52 | 11.74 | 14.95 | 0.63 | 1.68 | [illegible] | 6.92 |
| Combination | -0- | -0- | 3.02 | 5.73 | 5.55 | 5.33 | 0.96 | 1.92 | -0- | -0- | -0- | -0- | 1.08 | 7.56 | 2.25 | 4.96 |
| No One | 97.43 | 4.45 | 89.46 | 10.54 | 84.22 | 14.67 | 78.39 | 25.48 | 76.45 | 29.43 | 83.81 | 14.67 | 91.62 | 8.38 | 86.32 | 15.94 |
| **Totals for Conditions** | | | | | | | | | | | | | | | | |
| Handicapped Only | 4.37 | 1.77 | 20.35 | 5.36 | 15.67 | 4.25 | 12.31 | 2.69 | 20.29 | 3.90 | 21.37 | 2.04 | 16.60 | 4.52 | 16.53 | 6.07 |
| Nonhandicapped Only | 13.02 | 1.49 | 8.37 | 1.62 | 9.72 | 1.24 | 9.64 | 1.22 | 10.55 | 7.27 | 10.36 | 2.19 | 8.58 | 1.46 | 9.79 | 2.91 |
| Combination | 54.61 | 7.30 | 42.58 | 5.62 | 51.03 | 6.83 | 51.55 | 1.24 | 38.62 | 6.79 | 44.54 | 5.99 | 45.74 | 6.82 | 46.48 | 7.44 |
| No One | 28.21 | 7.56 | 28.60 | 3.06 | 23.52 | 5.50 | 26.49 | 3.17 | 30.54 | 3.08 | 23.73 | 7.26 | 29.32 | 3.54 | 27.35 | 4.95 |

# Table 7.5A

## Playmate Selections by Handicapped and Nonhandicapped Children Within Cohorts Across Various Play Areas in the Classroom

### Handicapped Subjects

| | Cohort 1 (Sp 79 KC) | | Cohort 2 (Sp 79 H) | | Cohort 3 (Su 79 H) | | Cohort 4 (F 79 H) | | Cohort 5 (Sp 80 H) | | Cohort 6 (F 80 H-1) | | Cohort 7 (Sp 81 HB) | | Total Across Cohorts | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | F | p |
| **Kitchen Area** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 6.63 | 4.79 | 13.24 | 9.86 | 17.10 | 10.20 | 9.96 | 3.31 | 31.32 | 19.22 | 30.13 | 10.24 | 21.06 | 11.80 | 18.77 | 13.03 | | |
| NH playmate selected | 26.04 | 8.95 | 5.12 | 6.65 | 2.72 | 3.85 | 9.87 | 4.52 | 10.57 | 7.22 | 10.47 | 3.34 | 9.41 | 5.96 | 8.72 | 6.49 | | |
| Combination playmate | 12.86 | 8.01 | 0.95 | 1.23 | 4.11 | 2.52 | 2.49 | 2.22 | 3.25 | 4.99 | 4.83 | 4.76 | 2.05 | 1.32 | 3.66 | 4.58 | | |
| No one selected | 64.45 | 0.67 | 83.64 | 12.11 | 76.07 | 8.53 | 77.62 | 6.49 | 57.36 | 14.52 | 54.56 | 11.57 | 67.47 | 11.65 | 69.13 | 13.56 | | |
| **P.E. Area** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 6.67 | 11.55 | 11.45 | 7.81 | 9.18 | 8.14 | 6.76 | 5.87 | 21.04 | 19.87 | 21.79 | 7.84 | 13.53 | 8.09 | 12.96 | 10.66 | | |
| NH playmate selected | 26.35 | 21.22 | 11.34 | 7.34 | 30.39 | 25.83 | 23.28 | 9.67 | 15.47 | 6.04 | 15.87 | 6.89 | 11.60 | 5.24 | 18.19 | 13.97 | | |
| Combination playmate | 24.46 | 8.86 | 11.41 | 10.64 | 9.57 | 12.34 | 10.11 | 6.62 | 12.88 | 5.53 | 5.00 | 3.00 | 20.40 | 7.73 | 13.47 | 9.80 | | |
| No one selected | 42.00 | 14.15 | 65.77 | 21.63 | 50.86 | 32.27 | 56.85 | 12.71 | 50.58 | 16.31 | 57.32 | 4.91 | 54.53 | 16.21 | 55.38 | 18.80 | | |
| **Art Area** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 14.30 | 4.42 | 17.41 | 4.53 | 35.40 | 12.71 | 16.98 | 2.30 | 21.42 | 6.70 | 21.99 | 14.91 | 26.92 | 7.87 | 22.90 | 10.31 | | |
| NH playmate selected | 19.73 | 18.53 | 22.41 | 6.76 | 22.12 | 8.93 | 32.69 | 12.73 | 16.59 | 8.30 | 14.54 | 9.72 | 9.86 | 6.11 | 19.13 | 11.23 | | |
| Combination playmate | 20.00 | 10.78 | 11.55 | 7.15 | 8.00 | 5.93 | 18.85 | 15.66 | 7.25 | 6.34 | 2.76 | 3.27 | 5.34 | 10.41 | 9.76 | 10.01 | | |
| No one selected | 45.40 | 25.09 | 48.21 | 9.02 | 34.46 | 17.37 | 31.45 | 5.40 | 54.71 | 15.15 | 60.70 | 24.75 | 57.85 | 16.02 | 48.19 | 18.17 | | |
| **Misc. Area** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 0 | 0 | 0 | 0 | 11.05 | 24.71 | 0 | 0 | 0 | 0 | 5.30 | 10.61 | 0.50 | 1.32 | 2.42 | 10.19 | | |
| NH playmate selected | 0 | 0 | 0.48 | 1.16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.56 | 2.96 | 0.42 | 1.50 | | |
| Combination playmate | 0 | 0 | 0 | 0 | 0 | 0 | 2.78 | 5.56 | 2.78 | 5.56 | 0 | 0 | 1.00 | 2.63 | 0.89 | 2.90 | | |
| No one selected | 100.00 | 0 | 99.52 | 1.17 | 89.95 | 22.48 | 97.22 | 5.56 | 97.22 | 5.56 | 94.69 | 10.61 | 96.94 | 4.36 | 96.42 | 9.67 | | |
| **Table Work Area** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 5.60 | 2.73 | 13.53 | 6.02 | 26.13 | 14.30 | 26.18 | 17.15 | 23.09 | 12.91 | 17.14 | 16.98 | 20.45 | 11.67 | 19.14 | 12.97 | | |
| NH playmate selected | 44.25 | 19.53 | 16.37 | 15.03 | 18.15 | 6.96 | 10.42 | 9.30 | 20.50 | 8.74 | 14.32 | 6.87 | 12.65 | 8.15 | 18.21 | 13.45 | | |
| Combination playmate | 11.69 | 10.63 | 3.23 | 5.48 | 6.15 | 4.87 | 5.50 | 4.66 | 7.89 | 3.26 | 2.90 | 4.04 | 4.25 | 3.87 | 5.38 | 5.46 | | |
| No one selected | 39.04 | 15.69 | 64.35 | 15.73 | 49.55 | 13.84 | 57.89 | 12.44 | 48.50 | 17.92 | 65.77 | 21.29 | 62.63 | 17.19 | 57.27 | 17.14 | | |
| **Manipulative Floor Play** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 19.01 | 3.64 | 23.23 | 21.33 | 3.90 | 7.41 | 5.95 | 1.28 | 7.38 | 9.83 | 18.65 | 11.07 | 14.60 | 5.50 | 13.52 | 12.47 | | |
| NH playmate selected | 22.76 | 5.09 | 9.53 | 9.36 | 33.61 | 14.04 | 22.39 | 5.59 | 5.64 | 5.73 | 6.16 | 10.01 | 14.42 | 10.35 | 16.14 | 12.97 | | |
| Combination playmate | 12.37 | 8.66 | 3.25 | 4.06 | 4.07 | 5.57 | 9.67 | 12.70 | 0.40 | 0.48 | 17.58 | 1.85 | 7.63 | 4.41 | 7.31 | 7.57 | | |
| No one selected | 46.16 | 7.45 | 63.92 | 25.50 | 58.20 | 9.97 | 61.98 | 13.15 | 86.56 | 15.15 | 57.59 | 16.24 | 63.28 | 12.96 | 63.05 | 17.75 | | |
| **Free Choice Area** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 7.07 | 12.15 | 15.52 | 7.82 | 26.04 | 9.52 | 11.54 | 5.19 | 25.33 | 9.08 | 18.03 | 10.75 | 10.66 | 9.93 | 16.04 | 10.53 | | |
| NH playmate selected | 14.11 | 3.35 | 11.54 | 9.77 | 15.36 | 8.63 | 16.61 | 9.50 | 12.30 | 4.08 | 6.48 | 2.74 | 10.43 | 9.06 | 12.17 | 7.75 | | |
| Combination playmate | 8.22 | 11.05 | 7.93 | 13.39 | 6.71 | 4.33 | 4.48 | 4.56 | 1.73 | 1.33 | 2.26 | 2.13 | 3.14 | 6.49 | 4.91 | 6.67 | | |
| No one selected | 70.03 | 14.19 | 64.62 | 15.47 | 51.86 | 16.12 | 67.35 | 15.91 | 60.12 | 9.13 | 73.16 | 12.96 | 75.76 | 29.10 | 66.86 | 16.47 | | |
| **Totals** | | | | | | | | | | | | | | | | | | |
| H playmate selected | 8.45 | 2.35 | 13.53 | 4.05 | 18.26 | 2.41 | 11.05 | 2.04 | 18.34 | 4.87 | 19.01 | 3.24 | 15.39 | 4.89 | 15.12 | 4.82 | | |
| NH playmate selected | 20.54 | 4.60 | 11.32 | 3.96 | 18.02 | 5.44 | 16.47 | 1.98 | 11.32 | 2.76 | 9.69 | 0.33 | 9.99 | 3.11 | 13.32 | 5.03 | | |
| Combination playmate | 12.87 | 2.18 | 5.48 | 3.23 | 5.43 | 1.72 | 7.70 | 1.80 | 5.05 | 0.78 | 5.05 | 0.74 | 6.27 | 3.81 | 6.43 | 3.22 | | |
| No one selected | 58.15 | 1.43 | 69.62 | 9.45 | 58.44 | 6.76 | 64.77 | 3.60 | 65.62 | 2.91 | 66.26 | 3.68 | 68.35 | 9.17 | 65.15 | 7.53 | | |

# Table 7.5B

## PLAYMATE SELECTIONS BY HANDICAPPED AND NONHANDICAPPED CHILDREN WITHIN COHORTS ACROSS VARIOUS PLAY AREAS IN THE CLASSROOM

### NONHANDICAPPED SUBJECTS

| | Cohort 1 (Sp 79 KC) | | Cohort 2 (Sp 79 H) | | Cohort 3 (Su 79 H) | | Cohort 4 (F 79 H) | | Cohort 5 (Sp 80 H) | | Cohort 6 (F 80 H-1) | | Cohort 7 (Sp 81 HB) | | Total Across Cohorts | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | F |
| **Kitchen Area** | | | | | | | | | | | | | | | | | |
| H playmate selected | 30.21 | 11.20 | 3.60 | 5.68 | 19.99 | 6.39 | 4.70 | 4.84 | 8.38 | 8.10 | 22.54 | 9.55 | 10.52 | 9.67 | 13.03 | 11.52 | |
| NH playmate selected | 5.87 | 6.94 | 36.19 | 9.31 | 30.75 | 1.56 | 44.65 | 15.33 | 38.00 | 28.65 | 20.24 | 6.42 | 12.90 | 11.55 | 27.69 | 18.60 | |
| Combination playmate | 17.03 | 13.29 | 15.28 | 10.46 | 9.54 | 8.93 | 5.10 | 5.92 | 4.27 | 3.71 | 7.33 | 8.21 | 1.98 | 0.36 | 7.96 | 8.54 | |
| No one selected | 46.87 | 14.25 | 44.91 | 15.32 | 39.69 | 12.37 | 45.54 | 12.67 | 49.33 | 21.70 | 49.22 | 13.18 | 74.57 | 12.41 | 51.31 | 17.30 | |
| **P.E. Area** | | | | | | | | | | | | | | | | | |
| H playmate selected | 18.28 | 14.43 | 17.03 | 7.81 | 7.90 | 2.96 | 6.07 | 7.62 | 19.79 | 18.16 | 12.83 | 7.14 | 22.26 | 11.21 | 14.96 | 11.33 | |
| NH playmate selected | 11.04 | 2.62 | 24.59 | 5.11 | 40.89 | 5.14 | 35.16 | 22.68 | 30.56 | 16.83 | 28.95 | 6.31 | 16.13 | 5.26 | 26.74 | 14.46 | |
| Combination playmate | 21.96 | 9.76 | 26.93 | 11.95 | 20.27 | 8.01 | 23.31 | 17.37 | 18.72 | 10.23 | 7.79 | 4.96 | 16.22 | 8.82 | 19.22 | 11.50 | |
| No one selected | 48.70 | 11.37 | 31.41 | 2.89 | 30.92 | 11.50 | 35.54 | 36.15 | 30.91 | 14.81 | 50.40 | 7.53 | 45.37 | 6.77 | 39.08 | 17.78 | |
| **Art Area** | | | | | | | | | | | | | | | | | |
| H playmate selected | 22.66 | 13.61 | 20.37 | 10.71 | 22.06 | 18.17 | 15.93 | 8.99 | 24.19 | 28.46 | 46.93 | 20.58 | 27.49 | 18.82 | 25.61 | 18.56 | |
| NH playmate selected | 34.16 | 32.26 | 35.95 | 6.38 | 16.63 | 9.52 | 35.81 | 25.77 | 34.95 | 23.45 | 3.92 | 2.23 | 13.26 | 5.72 | 24.89 | 21.01 | |
| Combination playmate | 16.71 | 16.50 | 17.57 | 15.62 | 9.76 | 19.08 | 16.79 | 15.71 | 6.14 | 7.09 | 7.34 | 4.15 | 4.55 | 3.03 | 11.15 | 11.37 | |
| No one selected | 26.79 | 12.41 | 26.08 | 5.34 | 51.55 | 17.72 | 31.45 | 26.79 | 34.69 | 27.55 | 41.29 | 18.05 | 54.68 | 14.82 | 38.36 | 20.38 | |
| **Misc. Area** | | | | | | | | | | | | | | | | | |
| H playmate selected | 3.03 | 5.25 | 1.14 | 2.27 | 0 | 0 | 0 | 0 | 0 | 0 | 1.92 | 3.84 | 0 | 0 | 0.76 | 2.33 | |
| NH playmate selected | 0 | 0 | 9.54 | 5.71 | 0 | 0 | 9.37 | 9.39 | 7.05 | 4.36 | 6.73 | 13.46 | 1.18 | 2.63 | 5.23 | 7.48 | |
| Combination playmate | 1.43 | 4.01 | 4.21 | 3.46 | 0 | 0 | 0 | 0 | 0 | 0 | 0.96 | 1.92 | 0 | 0 | 1.42 | 4.01 | |
| No one selected | 92.58 | 9.45 | 90.55 | 9.63 | 100.00 | 0 | 90.62 | 9.40 | 92.94 | 4.36 | 90.38 | 19.23 | 98.82 | 2.63 | 92.58 | 9.45 | |
| **Table Work Area** | | | | | | | | | | | | | | | | | |
| H playmate selected | 17.56 | 11.34 | 15.14 | 7.03 | 20.43 | 13.03 | 3.25 | 3.59 | 19.58 | 12.31 | 30.19 | 7.97 | 25.95 | 7.65 | 18.54 | 11.75 | |
| NH playmate selected | 12.52 | 7.50 | 32.69 | 10.77 | 28.70 | 21.39 | 60.11 | 25.87 | 29.87 | 17.94 | 10.57 | 4.26 | 15.56 | 6.53 | 27.09 | 22.25 | |
| Combination playmate | 43.43 | 14.37 | 9.56 | 5.12 | 16.57 | 27.35 | 14.07 | 12.51 | 13.47 | 16.13 | 4.35 | 5.94 | 9.46 | 5.19 | 14.54 | 15.00 | |
| No one selected | 26.46 | 7.32 | 42.58 | 15.16 | 34.46 | 14.09 | 22.55 | 14.96 | 46.07 | 10.97 | 54.88 | 14.22 | 49.01 | 9.28 | 39.11 | 16.14 | |
| **Manipulative Floor Play** | | | | | | | | | | | | | | | | | |
| H playmate selected | 25.01 | 8.90 | 13.50 | 12.42 | 14.93 | 1.26 | 3.53 | 4.03 | 3.95 | 5.09 | 31.97 | 21.11 | 17.77 | 6.35 | 15.14 | 13.48 | |
| NH playmate selected | 14.37 | 10.40 | 28.18 | 15.01 | 30.50 | 9.43 | 44.83 | 24.52 | 37.33 | 16.80 | 16.22 | 7.75 | 17.28 | 11.50 | 27.58 | 17.76 | |
| Combination playmate | 29.41 | 9.84 | 12.23 | 7.77 | 12.34 | 6.44 | 9.37 | 7.45 | 4.50 | 0.46 | 14.17 | 12.38 | 9.34 | 5.44 | 12.23 | 9.53 | |
| No one selected | 31.19 | 4.49 | 46.07 | 7.67 | 42.20 | 12.73 | 42.25 | 19.77 | 54.19 | 12,12 | 37.60 | 10.11 | 55.58 | 6.08 | 45.03 | 13.28 | |
| **Free Choice Area** | | | | | | | | | | | | | | | | | |
| H playmate selected | 10.43 | 5.89 | 11.83 | 4.20 | 18.37 | 15.35 | 5.06 | 3.28 | 12.43 | 17.67 | 15.33 | 9.99 | 19.08 | 9.64 | 13.05 | 19.33 | |
| NH playmate selected | 14.75 | 20.84 | 22.77 | 11.48 | 41.42 | 19.08 | 36.49 | 26.88 | 25.47 | 26.00 | 24.60 | 17.86 | 15.78 | 9.71 | 25.90 | 19.58 | |
| Combination playmate | 5.98 | 3.08 | 16.60 | 10.74 | 14.43 | 1.36 | 10.63 | 14.07 | 6.41 | 4.64 | 6.75 | 5.53 | 4.53 | 4.88 | 9.14 | 8.43 | |
| No one selected | 63.64 | 19.89 | 48.78 | 12.35 | 25.77 | 5.11 | 47.81 | 31.58 | 54.67 | 21.60 | 53.31 | 10.55 | 60.59 | 7.91 | 51.87 | 19.91 | |
| **Totals** | | | | | | | | | | | | | | | | | |
| H playmate selected | 18.17 | 3.22 | 11.83 | 5.36 | 14.79 | 1.90 | 5.50 | 2.19 | 12.62 | 8.31 | 23.10 | 5.67 | 17.58 | 5.28 | 14.44 | 7.15 | |
| NH playmate selected | 13.25 | 3.62 | 27.14 | 3.68 | 26.93 | 2.67 | 38.06 | 7.36 | 27.89 | 16.56 | 15.89 | 6.92 | 13.15 | 2.82 | 23.59 | 11.55 | |
| Combination playmate | 20.13 | 5.10 | 14.63 | 4.99 | 11.85 | 8.76 | 11.32 | 8.28 | 7.64 | 3.56 | 7.03 | 2.84 | 6.58 | 2.30 | 10.81 | 6.51 | |
| No one selected | 48.46 | 4.00 | 46.40 | 5.59 | 46.37 | 9.53 | 45.11 | 11.09 | 51.83 | 12.93 | 53.96 | 6.38 | 62.66 | 4.90 | 51.15 | 9.76 | |

(T-1A4A)

Study 5A

## Table 7.6A

### TYPE OF PLAY EXHIBITED BY HANDICAPPED AND NONHANDICAPPED CHILDREN ACROSS COHORTS IN VARIOUS CLASSROOM PLAY AREAS

### HANDICAPPED SUBJECTS

| | COHORT 1 (SP 79 KC) | | COHORT 2 (SP 79 H) | | COHORT 3 (SU 79 F) | | COHORT 4 (F 79 H) | | COHORT 5 (SP 80 H) | | COHORT 6 (F 80 H-1) | | COHORT 7 (SP 81 HB) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. | M % | S.D. |
| KITCHEN AREA | | | | | | | | | | | | | | |
| NO PLAY | 26.78 | 16.76 | 29.49 | 16.44 | 14.38 | 10.85 | 27.47 | 18.50 | 9.12 | 7.09 | 7.91 | 5.21 | 16.72 | 11.08 |
| ISOLATE PLAY | 37.67 | 17.36 | 61.19 | 13.69 | 61.69 | 14.88 | 50.20 | 16.10 | 48.23 | 10.19 | 46.61 | 8.75 | 50.74 | 5.86 |
| NONISOLATE PLAY | 35.55 | .67 | 19.32 | 12.11 | 23.93 | 8.53 | 22.33 | 6.49 | 42.65 | 14.52 | 45.50 | 11.61 | 32.53 | 11.65 |
| P.E. | | | | | | | | | | | | | | |
| NO PLAY | 29.88 | 17.55 | 27.55 | 18.50 | 28.06 | 27.66 | 29.96 | 14.62 | 18.77 | 16.88 | 23.03 | .97 | 22.88 | 11.09 |
| ISOLATE PLAY | 12.13 | 3.62 | 38.22 | 15.18 | 23.39 | 7.63 | 29.88 | 9.47 | 31.81 | 10.99 | 35.04 | 4.49 | 31.65 | 13.82 |
| NONISOLATE PLAY | 57.99 | 14.15 | 34.23 | 21.63 | 48.54 | 32.41 | 40.16 | 12.70 | 49.42 | 16.31 | 41.93 | 3.81 | 45.47 | 16.22 |
| ART AREA | | | | | | | | | | | | | | |
| NO PLAY | 11.95 | 7.94 | 17.67 | 11.31 | 9.68 | 7.23 | 8.19 | 3.85 | 11.68 | 11.45 | 4.23 | 2.40 | 17.32 | 8.76 |
| ISOLATE PLAY | 33.45 | 25.83 | 30.54 | 11.31 | 24.73 | 11.53 | 23.26 | 5.53 | 43.03 | 17.93 | 56.47 | 23.71 | 40.53 | 20.53 |
| NONISOLATE PLAY | 54.60 | 25.09 | 51.79 | 9.02 | 65.58 | 17.33 | 68.55 | 5.40 | 45.29 | 15.15 | 39.30 | 24.75 | 42.15 | 16.02 |
| MISC. AREA | | | | | | | | | | | | | | |
| NO PLAY | 86.33 | 8.17 | 94.37 | 6.10 | 97.18 | 4.06 | 97.22 | 5.56 | 78.70 | 14.93 | 84.08 | 24.66 | 94.06 | 8.35 |
| ISOLATE PLAY | 13.66 | 8.17 | 5.15 | 6.20 | 1.76 | 3.94 | 0 | 0 | 18.52 | 15.71 | 9.72 | 14.30 | 2.88 | 4.92 |
| NONISOLATE PLAY | .01 | 0 | .49 | 1.17 | 1.06 | 2.36 | 2.78 | 5.56 | 5.28 | 6.11 | 5.31 | 10.61 | 3.06 | 4.36 |
| TABLEWORK AREA | | | | | | | | | | | | | | |
| NO PLAY | 8.43 | 7.80 | 27.43 | 15.75 | 18.94 | 4.52 | 17.28 | 12.16 | 9.83 | 6.17 | 15.42 | 3.05 | 20.93 | 9.20 |
| ISOLATE PLAY | 30.61 | 10.20 | 37.43 | 4.10 | 30.61 | 11.83 | 40.60 | 3.74 | 38.68 | 16.61 | 50.35 | 22.25 | 41.64 | 16.93 |
| NONISOLATE PLAY | 60.96 | 15.69 | 35.15 | 15.78 | 50.45 | 13.84 | 42.11 | 12.44 | 51.50 | 17.92 | 34.23 | 21.29 | 37.38 | 17.18 |
| MANIPULATIVE FLOOR PLAY | | | | | | | | | | | | | | |
| NO PLAY | 18.40 | 10.84 | 24.76 | 18.45 | 44.93 | 16.02 | 19.38 | 7.25 | 13.15 | 9.32 | 11.99 | 7.62 | 18.95 | 14.59 |
| ISOLATE PLAY | 27.63 | 3.82 | 39.17 | 18.37 | 13.28 | 11.36 | 42.60 | 15.50 | 73.41 | 15.07 | 45.60 | 23.53 | 44.34 | 16.02 |
| NONISOLATE PLAY | 53.97 | 7.38 | 36.06 | 25.50 | 43.80 | 11.64 | 38.02 | 13.15 | 13.44 | 15.15 | 42.41 | 16.24 | 36.70 | 12.93 |
| FREE CHOICE AREA | | | | | | | | | | | | | | |
| NO PLAY | 54.95 | 22.07 | 25.03 | 15.90 | 27.10 | 8.52 | 8.77 | 7.00 | 7.80 | 6.56 | 22.99 | 18.93 | 24.91 | 6.49 |
| ISOLATE PLAY | 15.08 | 10.08 | 39.38 | 20.74 | 24.76 | 18.53 | 58.58 | 21.18 | 52.32 | 13.28 | 50.17 | 26.80 | 50.85 | 17.72 |
| NONISOLATE PLAY | 29.97 | 14.19 | 35.59 | 15.09 | 48.14 | 16.12 | 32.65 | 15.91 | 39.88 | 9.13 | 26.84 | 12.96 | 24.24 | 21.09 |
| TOTAL ACROSS AREAS | | | | | | | | | | | | | | |
| NO PLAY | 33.82 | 9.13 | 35.19 | 7.39 | 35.46 | 6.67 | 29.75 | 7.69 | 21.70 | 5.48 | 24.37 | 1.35 | 30.93 | 5.59 |
| ISOLATE PLAY | 24.32 | 7.71 | 34.44 | 4.99 | 24.56 | 3.68 | 35.02 | 6.71 | 43.93 | 2.61 | 41.99 | 3.50 | 37.52 | 9.60 |
| NONISOLATE PLAY | 41.86 | 1.42 | 30.33 | 9.48 | 40.26 | 7.97 | 35.23 | 3.60 | 34.73 | 3.14 | 33.65 | 4.06 | 31.65 | 9.16 |

## Table 7.6B

### Type of Play Exhibited by Handicapped and Nonhandicapped Children Across Cohorts in Various Classroom Play Areas

### Nonhandicapped Subjects

| | Cohort 1<br>(Sp 79 KC) | | Cohort 2<br>(Sp 79 H) | | Cohort 3<br>(Su 79 H) | | Cohort 4<br>(F 79 H) | | Cohort 5<br>(Sp 80 H) | | Cohort 6<br>(F 80 H-1) | | Cohort 7<br>(Sp 81 HB) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. | M % | s.d. |
| Kitchen Area | | | | | | | | | | | | | | |
| No Play | 12.60 | 5.62 | 16.59 | 8.18 | 11.20 | 2.11 | 18.47 | 15.47 | 2.96 | 2.48 | 11.66 | 9.42 | 11.45 | 4.23 |
| Isolate Play | 34.28 | 14.60 | 28.22 | 16.06 | 28.49 | 12.82 | 27.07 | 18.10 | 46.37 | 19.05 | 38.62 | 21.30 | 63.12 | 8.36 |
| Nonisolate Play | 53.12 | 14.25 | 55.29 | 15.50 | 60.31 | 12.37 | 54.46 | 12.68 | 50.66 | 21.27 | 49.72 | 12.04 | 25.43 | 12.42 |
| P.E. | | | | | | | | | | | | | | |
| No Play | 21.08 | 1.88 | 14.68 | 9.28 | 10.35 | 10.98 | 10.71 | .93 | 10.06 | 5.93 | 9.92 | 6.09 | 11.26 | 4.32 |
| Isolate Play | 27.62 | 11.50 | 16.74 | 7.43 | 20.57 | 5.97 | 8.71 | 3.99 | 20.85 | 13.67 | 40.74 | 10.12 | 34.10 | 8.47 |
| Nonisolate Play | 51.43 | 11.37 | 68.58 | 2.89 | 69.08 | 11.50 | 80.58 | 3.30 | 69.09 | 14.81 | 49.34 | 7.19 | 54.63 | 6.77 |
| Art Area | | | | | | | | | | | | | | |
| No Play | 12.23 | 6.76 | 8.15 | 3.44 | 6.47 | 4.73 | 8.58 | 10.44 | 9.35 | 5.93 | 5.48 | 5.33 | 9.50 | 4.48 |
| Isolate Play | 14.56 | 6.28 | 17.93 | 5.22 | 45.08 | 17.53 | 22.87 | 25.60 | 25.34 | 33.10 | 35.92 | 15.69 | 45.18 | 14.75 |
| Nonisolate Play | 73.21 | 12.41 | 73.92 | 5.35 | 48.45 | 17.72 | 68.55 | 26.79 | 65.31 | 27.55 | 58.60 | 18.08 | 45.32 | 14.82 |
| Misc. Area | | | | | | | | | | | | | | |
| No Play | 75.86 | 19.91 | 83.85 | 4.38 | 88.33 | 13.64 | 86.97 | 9.36 | 84.77 | 11.50 | 81.99 | 25.39 | 95.73 | 4.89 |
| Isolate Play | 14.70 | 10.55 | 1.15 | 1.33 | 11.66 | 13.64 | 3.67 | 6.50 | 8.17 | 13.07 | 8.39 | 9.76 | 3.09 | 5.10 |
| Nonisolate Play | 9.44 | 9.63 | 15.01 | 3.43 | 0 | 0 | 9.38 | 9.40 | 7.06 | 4.36 | 9.62 | 19.23 | 1.18 | 2.63 |
| Tablework Area | | | | | | | | | | | | | | |
| No Play | 8.93 | 5.49 | 24.50 | 18.04 | 9.98 | 8.67 | 13.15 | 14.66 | 20.57 | 4.61 | 9.69 | 4.44 | 15.82 | 6.36 |
| Isolate Play | 17.56 | 11.34 | 18.08 | 3.13 | 24.49 | 5.58 | 9.40 | 7.56 | 25.51 | 9.40 | 45.19 | 16.56 | 33.19 | 4.90 |
| Nonisolate Play | 73.53 | 7.32 | 57.42 | 15.16 | 65.54 | 14.09 | 77.45 | 14.96 | 53.93 | 10.97 | 45.12 | 14.22 | 50.99 | 9.27 |
| Manipulative.Floor Play | | | | | | | | | | | | | | |
| No Play | 7.54 | 1.56 | 20.68 | 8.88 | 12.27 | 5.22 | 24.97 | 16.99 | 10.12 | 5.38 | 6.73 | 4.60 | 10.03 | 5.58 |
| Isolate Play | 23.65 | 5.97 | 25.39 | 7.16 | 29.93 | 12.67 | 20.56 | 16.19 | 44.07 | 15.11 | 30.68 | 10.33 | 45.55 | 6.21 |
| Nonisolate Play | 68.81 | 4.49 | 53.93 | 7.87 | 57.80 | 12.73 | 54.46 | 24.75 | 45.81 | 12.13 | 62.39 | 10.13 | 44.41 | 6.08 |
| Free Choice Area | | | | | | | | | | | | | | |
| No Play | 38.70 | 14.10 | 30.89 | 15.22 | 6.29 | 7.69 | 12.97 | 7.35 | 19.09 | 17.95 | 10.96 | 6.79 | 7.67 | 3.36 |
| Isolate Play | 29.93 | 22.53 | 17.89 | 7.36 | 19.48 | 7.04 | 21.79 | 6.89 | 35.59 | 33.96 | 43.25 | 11.40 | 52.92 | 8.27 |
| Nonisolate Play | 31.36 | 19.89 | 51.22 | 12.35 | 74.23 | 5.10 | 65.24 | 13.96 | 45.33 | 21.60 | 46.69 | 10.55 | 39.41 | 7.91 |
| Total Across Areas | | | | | | | | | | | | | | |
| No Play | 25.27 | 1.63 | 28.47 | 6.71 | 20.70 | 2.30 | 25.69 | 8.18 | 22.42 | 3.89 | 19.36 | 3.63 | 23.07 | 1.49 |
| Isolate Play | 23.18 | 5.64 | 17.91 | 5.53 | 25.67 | 9.21 | 16.33 | 3.87 | 29.41 | 15.78 | 34.71 | 5.26 | 39.59 | 4.33 |
| Nonisolate Play | 51.56 | 4.01 | 53.63 | 5.55 | 53.63 | 9.53 | 57.28 | 6.04 | 48.17 | 12.93 | 45.93 | 6.36 | 37.34 | 4.90 |

## STUDY 5B: AN ANALYSIS OF THE INTERACTIONS AND PLAY OF HANDICAPPED AND NONHANDICAPPED CHILDREN IN INTEGRATED PRESCHOOL ENVIRONMENTS (PI: Peterson)

While mainstreaming of young handicapped children into regular early childhood center appears to be a theoretically viable alternative for providing early intervention services to selected children, the assumptions underlying its practice are subject to question. For example, does physical integration of handicapped and nonhandicapped preschoolers in a mainstreamed environment produce actual social integration between the two groups? Or, is it possible that when given the numerous opportunities for free play and social activity typically provided in preschools, handicapped youngsters and their normally developing peers regroup in ways that are counterproductive to the purposes of mainstreaming? Does the mere placement of the two populations in one preschool (and their simultaneous participation in the same activities) assure the benefits for children that educators assume will come from mainstreaming? In view of the current emphasis upon mainstreaming as an alternative means for serving handicapped preschoolers, these questions are important ones. It is a relatively simple task for early childhood centers to open their doors and enroll handicapped children along with other normally developing preschoolers. Or, it appears easy for special early childhood intervention programs to incorporate a few normally developing children as models into a previously segregated setting. The apparent simplicity of either type of mainstreaming and the popularity of this approach can lure well meaning administrators and teachers into creating such programs without giving sufficient attention to the real responsibilities entailed in successful mainstreaming. But there is much more to mainstreaming than meets the eye. Once children are placed together in the same classroom, the task of providing individualized education that is interventive in nature for the handicapped child, while simultaneously integrating them into the social and instructional mainstream of the classroom, presents a very complex set of issues. Obviously, physical integration does not automatically assure spontaneous social acceptance by peers. Neither does it assure that a handicapped child will not be isolated and separated instructionally because of disruptiveness, inattentive behavior, or the inability to perform the same tasks as other children. Or, in the case of reverse mainstreaming where nonhandicapped children are integrated with a majority of handicapped preschoolers, there is not automatic assurance that they too will be included appropriately.

Successful mainstreaming thus means that a child must be (a) temporally integrated (spends a meaningful amount of time with other peers), (b) socially integrated (in that there is no isolation or rejection and that a child indeed associates and interacts with peers in meaningful ways), and (c) instructionally integrated (there is a sharing in the instructional environment that allows a handicapped child to interact with and work with nonhandicapped peers). Thus if successful mainstreaming, according to this definition, is to be achieved, it would appear dependent upon two interrelated variables: (1) mutual association or social proximity of handicapped children with their normally developing peers during class activities, and (2) a meaningful level of interaction between the two subpopulations of children. This raises an important issue: Whether spontaneous interaction patterns and playmate selections, and overall forms of play behavior exhibited among integrated groups of preschoolers produce a level of social interchange that enables the goals of mainstreaming to be realized. It is to this question that the present research study is addressed.

Purpose. The purpose of this study was to describe the peer interactions and isolate/nonisolate play behaviors exhibited by 27 handicapped and 27 nonhandicapped children during their free play activities in early intervention preschool environments. The intent of this study was to examine the degree of integration achieved in such programs as suggested by the frequency and quality of social exchanges among mixed groups of preschoolers.

Subjects/Settings. Subjects included in this study encompassed a total of 27 nonhandicapped and 27 handicapped preschoolers, all of whom were enrolled in integrated special early intervention programs. Integrated intervention programs refer to those designed primarily for handicapped children, but which include a small proportion of nonhandicapped children who are enrolled as "normal models." Represented within the total group of subjects were subsets of handicapped/nonhandicapped classmates who were enrolled in the same classrooms. A total of seven (7) different classroom groups are represented within the total subject pool. A preliminary analysis of data across different classroom cohorts suggested that subjects were somewhat similar in their play and interactional patterns. Thus, it appeared legitimate to combine subsets or subject cohorts rather than attempt analyses by individual (but small n) cohorts. All subsets of subjects were enrolled in preschool settings where handicapped children comprised two-thirds of the classroom enrollment. Nonhandicapped preschoolers, enrolled as models, comprised the remaining third of each classroom population in which the subjects were a part.

The classroom settings in which subjects were observed involved typical preschool environments in which specific play areas were organized within the room. Each play area (such as the playhouse area, art table area, manipulative floor play area, etc.) contained certain types of materials and had specific boundaries defined that were apparent to both teachers and children. These play areas were standardized in every preschool setting prior to data collection so that the free play environments across each integrated classroom were similar on three basic criteria. That is, (1) they were organized into the same play areas, six in all, and for which three were made available to children on any given day, (2) similar types of toys were available and placed in certain areas so that each area was similar across settings, and (3) the same sets of three play areas were made available on a given day and rotated every other day with the other set of three play areas. In addition, teachers in each site were given the same instructions regarding their roles during free play and on the style and frequency of interaction they were to use with the children. Teachers were given feedback by research staff on their implementation of such interactional styles to assure that the general preschool environment was achieved as desired. More detailed descriptions of the classroom free play settings are given under Study 5A, which are the same as that created for this study. Those descriptions will therefore not be repeated here.

Experimental Design/Data Collection. Observational data were collected daily on each subject (both handicapped and nonhandicapped children) using 30 second observational intervals. A total of two five minute samples of data were obtained on each subject each day, five days a week. Over a 8-10 week period, this produced a potential of over 800-900 independent intervals of data on each subject, depending on absenteeism. The experimental design and data collection procedures used for this study are the same as those described for Study 5A and hence will not be reiterated here. (See Study 5A for more detailed explanation of data collection.) Experienced data clerks, who had been trained prior to the study on the Peterson Observation System for Social Interaction (1978) to a minimum competency level of 85%, conducted reliability checks 2-3 times weekly in their respective research sites. Reliability was maintained at all times at no less than 85% and average reliability across observers ranged between 90-100%.

Results/Discussion. Numerous comparisons were made to analyze social interactions and play behavior of handicapped and nonhandicapped subjects. This included comparisons within groups (H or NH) and across groups (H x NH). A few of those analyses are presented here in very brief form.

1. Comparisons were made between handicapped (H) and nonhandicapped (NH) subjects on no play/play across the various play areas. A repeated Measures ANOVA comparing groups on the variable of play resulted in a significant difference between groups of .01 (F = 11.80, p = 0012, df = 1,52). A significant difference of .001 was found between areas (F = 334.93, p = .0000, df = 6,312). No significant interaction was found (F = 1.17, p = .3225, df = 6,312. A summary of group means by area is shown in Table 7.7.

2. Comparisons were made between H and NH subjects in regard to type of play exhibited within and across play areas. Type of play was analyzed in regard to proportions of no play, solitary play, parallel, and cooperative play exhibited by subject groups (H or NH) within and across play areas. Table 7.8A summarizes means and standard deviations for these variables and provides marginal means on variables across areas for H and NH subjects. Repeated Measures Analysis of Variance tests were run to determine if there were significant differences between H and NH subjects the type of play they exhibited in the integrated free play environment. Results of that analysis are shown in Table 7.8B. It should be noted that Repeated Measures ANOVA's were run on each type of play across all play areas, thus results of four different tests are summarized on the table. As shown, significant differences were apparent ($p < .01$) between H and NH subjects in the type of play in which they engaged. Significant differences were also shown in the type of play exhibited across areas. No significant interactions were found between groups and areas. Inspection of the means on Table 7.8A shows that H subjects engaged in more no play than their NH counterparts. They also engaged in more solitary play than NH subjects. On the other hand, the NH preschoolers exhibited higher rates of parallel play (45% vs. 33%) over the H subjects and slightly more cooperative play (4.5% vs. 2.[illegible]%).

3. The frequency with which subjects interacted with their peers was analyzed by comparing rates of isolate and nonisolate play behavior. Means and standard deviations for each group across each group plus

marginal means are presented in Table 7.9A. By looking at the marginal means, it is apparent that H subjects engaged in more isolate play (35%) than did NH subjects (27%). The NH subjects, in comparison, were engaged in nonisolate play in 49% of the observed interactions and H subjects interacted with peers in only 36% of their observations. Repeated Measures Analyses of Variance were run to compare H and NH subjects on each isolate/nonisolate play across each of the seven play areas. Results of that analyses are shown in Table 7.9B. As can be seen, significant differences were indicated between groups for both comparisons on isolate and nonisolate behavior ($p < .01$). Comparisons between play areas on the isolate/nonisolate play variable also indicated significant differences ($p < .01$), but no significant interactions were shown.

4. Peer interactions of H and NH subjects were compared in relationship to those conditions were certain playmate types were available. For example, when only handicapped peers were available, subjects could engage in play with no one or play with the handicapped peer(s). Similarly, when combinations of playmates were available, a subject could elect to play with (a) no one, (b) the H peer(s), (c) the NH peer(s) or (d) a combination of both H and NH. Percentage breakdowns on whom subjects interacted with under each of the various playmate conditions are provided in Table 7.10. A cursory inspection of that table shows no matter who was available for play, NH subjects were more likely to enter into interaction with them. It is also apparent that when only one playmate type was available to NH subjects, the normal subjects interacted at a higher rate when that peer type was NH rather than H. A similar, but much smaller trend was shown with H subjects. Interesting interactions were shown when combination peers were available. First, H children engaged in more noninteraction during such times than their NH counterparts. If only one playmate type was chosen from the combinations available, NH children tended to pick like peers rather than NH peers (28% vs. 16%). On the other hand, the handicapped were less discriminatory and played at relatively similar rates with either H or NH peers.

Statistical analyses were run to see if significant differences existed between H and NH groups on the interactions that occurred under each availability condition. A one way-analysis of variance on interaction with the H peer(s) when only H peers only were available showed a significant difference at .05 between groups ($F = 5.22$; $df = 1.52$; $p = .0264$). Under the condition when NH peers only were available, a significant different at the .001 level was shown between the two subject groups in regard to their interaction with the NH peer(s). ($F = 16.05$, $df = 1.52$; $p = .0002$). For the combination available condition, a repeated measures analysis of variance was run to see if there were significant differences between H and NH subjects in their subsequent interactions. Significant differences at the .001 were found between H and NH groups ($F = 21.19$; $df = 1,52$; $p = .0000$). Significant differences occurred also between areas ($F = 12.98$; $df = 2,104$; $p. = .0000$) and a significant interaction was also shown ($F = 4.32$; $df = 2,104$; $p = .0158$).

5. Final analyses were made comparing the type of play that occurred with the various playmate types. A summary of means for NH and H groups is provided in Table 7.11A. Repeated analyses of variance tests were run to compare H and NH groups on parallel play and then on cooperative play across the various playmate availability conditions. Results are shown in Table 7.11B. As indicated significant differences at .01 were shown between groups as well as across availability conditions.

## Table 7.7

COMPARISON OF PLAY/NO PLAY BEHAVIOR EXHIBITED BY HANDICAPPED AND NONHANDICAPPED SUBJECTS IN VARIOUS PLAY AREAS WITHIN INTEGRATED PRESCHOOL CLASSROOMS

| | HANDICAPPED SUBJECTS (N = 27) | | NONHANDICAPPED SUBJECTS (N = 27) | |
|---|---|---|---|---|
| | MEAN % | SD | MEAN % | SD |
| KITCHEN AREA | | | | |
| NO PLAY | 18.96 | 14.22 | 12.34 | 9.21 |
| PLAY | 81.03 | | 87.65 | |
| P.E. | | | | |
| NO PLAY | 23.66 | 12.38 | 12.29 | 6.58 |
| PLAY | 76.34 | | 87.70 | |
| ART | | | | |
| NO PLAY | 10.85 | 8.46 | 8.64 | 6.10 |
| PLAY | 89.15 | | 91.36 | |
| MISC. AREA | | | | |
| NO PLAY | 91.03 | 12.69 | 85.50 | 13.43 |
| PLAY | 8.97 | | 14.53 | |
| TABLE WORK | | | | |
| NO PLAY | 17.07 | 10.63 | 15.57 | 10.57 |
| PLAY | 82.91 | | 84.42 | |
| MANIPULATIVE FLOOR PLAY | | | | |
| NO PLAY | 18.83 | 11.64 | 13.48 | 10.40 |
| PLAY | 81.16 | | 86.51 | |
| FREE CHOICE | | | | |
| NO PLAY | 23.57 | 17.90 | 17.23 | 14.39 |
| PLAY | 76.18 | | 82.62 | |
| MARGINAL MEANS | | | | |
| NO PLAY | 29.14 | | 23.58 | |
| PLAY | 70.82 | | 76.41 | |

T-1A.3B

Study 5B

## Table 7.8A

### Comparison on Type of Play Exhibited in Various Play Areas in Preschool Free Play Settings by Handicapped and Nonhandicapped Subjects

| | Handicapped Subjects (n = 27) Mean % | Handicapped Subjects (n = 27) SD | Nonhandicapped Subjects (n = 27) Mean % | Nonhandicapped Subjects (n = 27) SD |
|---|---|---|---|---|
| Kitchen Area | | | | |
| No Play | 18.37 | 14.22 | 12.36 | 9.21 |
| Solitary Play | 50.36 | 13.44 | 39.31 | 19.73 |
| Parallel Play | 28.51 | 11.98 | 43.53 | 15.60 |
| Cooperative Play | 2.14 | 5.74 | 4.94 | 6.32 |
| P.E. Area | | | | |
| No Play | 23.77 | 12.38 | 12.30 | 6.57 |
| Solitary Play | 25.96 | 12.59 | 24.56 | 13.24 |
| Parallel Play | 37.80 | 11.30 | 53.56 | 11.73 |
| Cooperative Play | 8.42 | 9.87 | 9.63 | 6.78 |
| Art Area | | | | |
| No Play | 10.85 | 8.46 | 8.73 | 6.10 |
| Solitary Play | 35.39 | 20.52 | 28.51 | 19.96 |
| Parallel Play | 52.85 | 19.26 | 61.51 | 18.46 |
| Cooperative Play | .27 | .61 | 1.23 | 2.39 |
| Misc. Area | | | | |
| No Play | 91.03 | 12.69 | 85.23 | 13.43 |
| Solitary Play | 6.87 | 10.26 | 6.53 | 9.09 |
| Parallel Play | 1.68 | 4.64 | 5.24 | 8.71 |
| Cooperative Play | .52 | 2.19 | 3.00 | 7.12 |
| Tablework Area | | | | |
| No Play | 17.07 | 10.53 | 15.57 | 10.57 |
| Solitary Play | 38.87 | 14.26 | 25.71 | 13.39 |
| Parallel Play | 43.30 | 16.76 | 56.07 | 13.43 |
| Cooperative Play | .77 | 1.58 | 2.70 | 4.43 |
| Manipulative Floor Play | | | | |
| No Play | 18.84 | 11.64 | 13.40 | 10.40 |
| Solitary Play | 41.32 | 21.15 | 32.76 | 13.10 |
| Parallel Play | 35.61 | 15.08 | 47.47 | 11.51 |
| Cooperative Play | 4.24 | 8.55 | 6.26 | 5.83 |
| Free Choice | | | | |
| No Play | 23.60 | 17.90 | 17.23 | 14.30 |
| Solitary Play | 42.66 | 22.56 | 32.35 | 19.57 |
| Parallel Play | 32.42 | 16.36 | 46.58 | 17.54 |
| Cooperative Play | 1.32 | 2.14 | 3.31 | 4.26 |
| Marginal | | | | |
| No Play | 29.15 | | 23.58 | |
| Solitary Play | 35.13 | | 27.20 | |
| Parallel Play | 33.16 | | 44.88 | |
| Cooperative Play | 2.51 | | 4.47 | |

T-1A.3C

## Table 7.8B

F Ratios for Repeated Measure Analyses of Variance on Type of Play
Exhibited by Handicapped and Nonhandicapped preschoolers in Integrated Free Play Settings

| Variables | Handicapped vs. Nonhandicapped[1] | | Area[2] | | Interaction[3] | |
|---|---|---|---|---|---|---|
| | F | p | F | p | F | p |
| No Play | 11.61 | .0013** | 340.14 | .0000** | 1.20 | .3064 |
| Solitary Play | 8.38 | .0055** | 39.53 | .0000** | 1.24 | .2864 |
| Parallel Play | 34.52 | .0000** | 89.38 | .0000** | 1.36 | .2291 |
| Cooperative Play | 8.48 | .0053** | 15.10 | .0000** | .24 | .9623 |

T-1A.3C

[1] DF = 1,52 ** Sig at .01

[2] DF = 6,312

[3] DF = 6,312

## Table 7.9A

### COMPARISON OF ISOLATE & NONISOLATE PLAY BY HANDICAPPED AND NONHANDICAPPED PRESCHOOLERS IN INTEGRATED CLASSROOM ENVIRONMENTS

| | HANDICAPPED SUBJECTS (N=27) | | NONHANDICAPPED SUBJECTS (N=27) | |
|---|---|---|---|---|
| | MEAN % | S.D. | MEAN % | S.D. |
| **KITCHEN AREA** | | | | |
| NO PLAY | 18.96 | 14.22 | 12.34 | 9.21 |
| ISOLATE PLAY | 50.35 | 13.66 | 39.29 | 19.78 |
| NONISOLATE PLAY | 30.70 | 13.79 | 48.38 | 17.56 |
| **P.E.** | | | | |
| NO PLAY | 23.76 | 12.42 | 12.30 | 6.57 |
| ISOLATE PLAY | 30.11 | 12.65 | 24.56 | 13.24 |
| NONISOLATE PLAY | 46.12 | 14.49 | 63.15 | 13.43 |
| **ART AREA** | | | | |
| NO PLAY | 10.85 | 8.46 | 8.64 | 6.10 |
| ISOLATE PLAY | 35.99 | 20.52 | 23.42 | 19.96 |
| NONISOLATE PLAY | 53.16 | 19.21 | 62.94 | 19.54 |
| **MISC. AREA** | | | | |
| NO PLAY | 91.03 | 12.69 | 85.50 | 13.43 |
| ISOLATE PLAY | 6.37 | 10.26 | 6.80 | 9.08 |
| NONISOLATE PLAY | 2.47 | 5.18 | 7.70 | 9.51 |
| **TABLEWORK AREA** | | | | |
| NO PLAY | 17.07 | 10.63 | 15.57 | 10.57 |
| ISOLATE PLAY | 38.87 | 14.26 | 25.71 | 13.39 |
| NONISOLATE PLAY | 44.05 | 16.89 | 58.71 | 14.39 |
| **MANIPULATIVE FLOOR PLAY** | | | | |
| NO PLAY | 18.33 | 11.64 | 13.99 | 10.40 |
| ISOLATE PLAY | 41.52 | 21.15 | 32.98 | 13.10 |
| NONISOLATE PLAY | 40.32 | 17.07 | 52.99 | 13.09 |
| **FREE CHOICE AREA** | | | | |
| NO PLAY | 23.57 | 17.90 | 17.23 | 14.89 |
| ISOLATE PLAY | 42.63 | 22.56 | 32.85 | 19.58 |
| NONISOLATE PLAY | 33.79 | 16.45 | 49.91 | 17.87 |
| **MARGINAL** | | | | |
| NO PLAY | 29.15 | | 23.58 | |
| ISOLATE PLAY | 35.16 | | 27.20 | |
| NONISOLATE PLAY | 35.79 | | 49.22 | |

T- 1A.3A

## Table 7.9B

### F Ratios for Repeated Measures Analyses of Variance on Isolate/Nonisolate Behavior of Handicapped and Nonhandicapped Subjects in Integrated Preschool Settings

| | Handicapped vs. Nonhandicapped[1] | | Area[2] | | Interaction[3] | |
|---|---|---|---|---|---|---|
| | F | P | F | P | F | P |
| No Play | 11.62 | .0013** | 340.04 | .0000** | 1.21 | .3019 |
| Isolate Play | 8.41 | .0055** | 39.54 | .0000** | 1.23 | .2905 |
| Nonisolate Play | 33.70 | .0000** | 88.55 | .0000** | 1.41 | .2088 |

T-1A.3A

[1] DF = 1,52 **SIG AT .01

[2] DF = 6,312

[3] DF = 6,312

Study 5B

## Table 7.10

### COMPARISON OF PEER INTERACTION BY HANDICAPPED AND NONHANDICAPPED

| | HANDICAPPED SUBJECTS (N = 27) | | NONHANDICAPPED SUBJECTS (N = 27) | |
|---|---|---|---|---|
| | MEAN % | S.D. | MEAN % | S.D. |
| HANDICAPPED PEERS AVAILABLE | | | | |
| NO INTERACTION | 62.80 | 9.31 | 54.61 | 15.97 |
| INTERACTION WITH H PEER(S) | 36.99 | 9.45 | 45.17 | 16.02 |
| NONHANDICAPPED PEERS AVAILABLE | | | | |
| NO INTERACTION | 59.72 | 14.86 | 42.54 | 15.60 |
| INTERACTION WITH NH PEER(S) | 40.04 | 14.85 | 57.05 | 16.31 |
| COMBINATION PEERS AVAILABLE | | | | |
| NO INTERACTION | 48.44 | 8.07 | 38.28 | 8.22 |
| INTERACTION WITH H PEER(S) | 18.02 | 6.11 | 15.64 | 7.10 |
| INTERACTION WITH NH PEER(S) | 20.21 | 5.85 | 27.82 | 12.37 |
| INTERACTION WITH COMBINATION | 13.30 | 4.83 | 18.26 | 8.95 |

T-1B.5

## Table 7.11A

### COMPARISON OF HANDICAPPED AND NONHANDICAPPED SUBJECTS ON TYPE OF INTERACTION WITH VARIOUS PLAYMATE OPTIONS

| | HANDICAPPED SUBJECTS (N = 27) | | NONHANDICAPPED SUBJECTS (N = 27) | |
|---|---|---|---|---|
| | MEAN % | SD | MEAN % | SD |
| HANDICAPPED PLAYMATE(S) | | | | |
| PARALLEL PLAY | 16.19 | 5.44 | 15.17 | 7.09 |
| COOPERATIVE PLAY | .90 | .98 | 1.05 | 1.08 |
| NONHANDICAPPED PLAYMATE(S) | | | | |
| PARALLEL PLAY | 15.15 | 5.33 | 22.45 | 10.99 |
| COOPERATIVE PLAY | .94 | 1.10 | 2.67 | 2.16 |
| COMBINATION PLAYMATE(S) | | | | |
| PARALLEL PLAY | 7.29 | 5.42 | 11.56 | 6.56 |
| COOPERATIVE PLAY | .45 | .66 | .95 | .97 |
| TOTAL NO PLAY | 20.43 | 7.11 | 15.44 | 5.84 |
| TOTAL SOLITARY | 38.64 | 9.40 | 30.72 | 12.67 |
| | 100.00 | | 100.00 | |

T-1A4B

160

Study 5B

## Table 7.11B

F Ratios for Repeated Measure Analyses of Variance on Type of Social Interaction Exhibited by Handicapped and Nonhandicapped Preschoolers

| | Handicapped vs. Nonhandicapped[1] | | Playmate Condition[2] | | Interaction[3] | |
|---|---|---|---|---|---|---|
| | F | p | F | p | F | |
| Parallel Play | 22.55 | .0000** | 20.58 | .0000** | 4.00 | .02 |
| Cooperative Play | 12.14 | .0010** | 13.82 | .0000** | 7.26 | .00 |

T-1A4B

[1] df = 1,52

[2] df = 2,104

[3] df = 2,104

* sig at .05

** sig at .01

## Study 5C: COMPARISON OF HANDICAPPED PRESCHOOLERS IN SEGREGATED AND INTEGRATED CLASSROOM ON SOCIAL INTERACTION WITH PEERS AND PLAY BEHAVIOR

(PI's: Peterson and Blackbourn)

A major premise that underlies the integration of handicapped and nonhandicapped preschool children is that handicapped children will profit from exposure to nonhandicapped children. For example, it is typically suggested that the nonhandicapped peers will provide more developmentally appropriate models than would be available in a totally segregated setting. Nonhandicapped children would thus provide greater peer stimulation and opportunity for social and play interaction than would be possible if handicapped children were left to interact only with other developmentally deficient models. Many of the arguments or projected benefits of integrated or mainstreamed settings have been described and elaborated upon by a number of writers, including Guralnick (1976 and 1978), Peterson & Haralick (1977), and Bricker (1978).

The dearth of empirical literature regarding the actual effects of integration upon the learning environment of handicapped children is of concern in view of the growing use of this approach in preschool settings. An examination of play and social behavior of handicapped children in segregated and integrated settings may help provide information on the effects of the social environment in which a child is a part. On the basis of the presumed benefits of integrating handicapped and nonhandicapped preschoolers, one could hypothesize that handicapped children exposed to an integrated setting will display a higher level of play and social interactions than children in segregated settings. The basis of this assumption lies in the exposure that integrated children would have to normally developing peer models. To date, such a comparison has not been examined. This study, therefore was designed to compare the social and play behaviors of handicapped children in an integrated setting to those of children in a segregated setting.

Purpose. The purpose of this study was to compare the social and play behaviors of handicapped children in a segregated setting to those of a matched group of handicapped children in an integrated setting to determine if there were qualitative and/or quantitative differences in the types of play and social interaction they exhibit. A segregated setting is one in which the enrollment contains only handicapped children. An integrated setting is one that is primarily designed for handicapped children, but includes from 20-50% nonhandicapped children enrolled as peer models. Using a 30-second observation instrument, descriptive data were collected on the type and extent of play and social behavior of children in each type of setting.

Subjects. Subjects for this study were seven children from an integrated setting and seven children from a segregated setting. Table 7.12 provides descriptive information on subjects from both settings. Children from both groups were matched as closely as possible across age, sex, level and type of disability, and length of time in intervention. Children from the segregated setting were five girls and two boys whose mean age was 5 years. Children in this setting included children in the mild to moderate range of mental retardation. Subjects characteristics are summarized in Table 7.12.

Children in the integrated setting included five girls and two boys whose mean age was 5.1 years. These children also displayed disabilities in the mild to moderate range.

Setting. The segregated setting for this study was located in Topeka, Kansas in a special center for handicapped children. The Special Education Early Intervention Project preschools at the University of Kansas was the integrated setting from which the matched group of handicapped subjects were drawn. The segregated setting served only preschool-aged handicapped children. Approximately 12 children were enrolled in the program and represented a variety of handicapping conditions from mild to severe. The integrated site located at the University of Kansas was a special preschool classroom into which a small number of normally developing children were enrolled as peer models, serving approximately 16 children. Approximately one third of the integrated classroom children were nonhandicapped peer models. Handicapping conditions represented in this population included mental retardation, and sensory, orthopedic, speech, and health impairments.

Specific play areas, identical for both sites, were determined and defined by the materials and activities within them and included: table work, manipulative play, free choice, art, kitchen, physical education, and miscellaneous play areas.

The classroom environments within the segregated or integrated settings where subjects attended preschool were organized (prior to data collection) into clearly defined play areas. The organization of the free play setting of areas is described earlier in Study 5A and will therefore not be repeated here.

Experimental Design/Data Collection Procedures. Since this study involved the observation of handicapped preschoolers in their naturalistic free play classroom environment, no experimental manipulations were made utilized in this study. Observations were simply made on subjects' social and play behavior exhibited during regularly scheduled free play times in the classrooms of the integrated and segregated sites. Daily observation was conducted using the Peterson Preschool Observational System for Social Interaction (1978). Detailed procedures utilized in this study are identical to those in Study 5.

Data Collection. Data were collected in each setting/site for an approximately 8 week period on each subject. Using the Peterson observation code, data were collected on where the subject played (play area), who was available as a potential playmate, and the type of play (no play, solitary, parallel, and cooperative) in which children engaged.

Specific procedures used for data collection were identical to those described in Study 5A and therefore will not be reiterated here. See Study 5A for a more detailed explanation of observation procedure and the nature of data collected.

Results/Discussion. Matched subjects from the segregated and integrated settings were compared in relation to the type of play behavior they exhibited. Interactional patterns were also compared. Results were as follows:

1. Total mean percentages on type of play for integrated groups are shown in Table 7.13A. A breakdown of the same variables by play area is shown in Table 7.13B. Repeated Measures Analyses of Variance were computed to determine if there were significant differences between integrated and segregated handicapped groups or between areas. Results as shown in Table 7.13C indicated significant differences between the segregated and integrated subjects in regard to type of play. However, significant differences at the .01 or .001 level were found between areas. This suggests that play area does have an affect upon the type of play manifest by young children regardless of whether they are handicapped or not. A significant interaction between group (segregated vs. integrated) and area (see Table 7.13B) at the .01 level was shown. This suggests that there were differences in the kind of play integrated and segregated handicapped children engaged, depending upon the particular play area in which they played.

2. Table 7.14A shows mean percentages and standard deviations on the proportion of isolate and nonisolate play segregated and integrated subjects engaged. Figures on no play and total intervals in play are provided as a reference to clarify percentage points. Table 7.14B provides results from Repeated Measures Analyses of Variance tests that were run on each variable on data broken down for all play areas. As shown in the table, no significant differences were found between segregated and integrated groups. Differences in isolate/nonisolate play, however, were apparent between play areas regardless of whether subjects were integrated or segregated.

## Table 7.12

### CHARACTERISTICS OF HANDICAPPED SUBJECT COMPARISON GROUPS IN INTEGRATED AND SEGREGATED SETTINGS

| SEGREGATED HANDICAPPED SUBJECTS | | | | | INTEGRATED HANDICAPPED SUBJECTS | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SUBJECT | SEX | AGE | HANDICAPPING CONDITION | SEVERITY | SUBJECT | SEX | AGE | HANDICAPPING CONDITION | SEVERITY |
| A.K.T. | F | 5-3 | MENTAL RETARDATION | MILD | M.K.H. | F | 5-4 | MENTAL RETARDATION (DOWN'S SYNDROME) | MILD |
| B.S.T. | F | 4-4 | DEVELOPMENTAL RETARDATION | MODERATE | D.C.H. | F | 4-5 | DEVELOPMENTAL RETARDATION | MODERATE |
| G.H.T. | F | 5-11 | MENTAL RETARDATION (DOWN'S SYNDROME) | MODERATE | E.H.H. | F | 5-8 | MENTAL RETARDATION (DOWN'S SYNDROME) | MODERATE |
| H.J.T. | F | 4-4 | MENTAL RETARDATION (GENETIC ABNORMALITY) | MODERATE | O.R.K. | F | 4-3 | MENTAL RETARDATION<br>ORTHOPEDIC DISABILITY | MILD |
| J.D.T. | M | 5-4 | MENTAL RETARDATION (DOWN'S SYNDROME) | MODERATE | K.D.H | M | 5-7 | MENTAL RETARDATION (DOWN'S SYNDROME) | MODERATE |
| W.M.T. | M | 5-3 | DEVELOPMENTAL DELAY (CULTURAL DISADVANTAGE) | MILD | C.J.H. | M | 5-5 | DEVELOPMENTAL DELAY (CULTURAL DISADVANTAGE) | MILD |
| S.A.T. | F | 5-4 | MENTAL RETARDATION (DOWN'S SYNDROME) | MODERATE | R.A.H. | F | 5-1 | MENTAL RETARDATION (DOWN'S SYNDROME) | MODERATE |

## Table 7.13A

TYPE OF PLAY EXHIBITED BY SEGREGATED AND INTEGRATED HANDICAPPED PRESCHOOLERS IN VARIOUS CLASSROOM PLAY AREAS

| | H SUBJECTS (SEGREGATED SETTINGS) | | H SUBJECTS (INTEGRATED SETTINGS) | |
|---|---|---|---|---|
| | M % | S.D. | M % | S.D. |
| **PLAY HOUSE AREA** | | | | |
| NO PLAY | 9.77 | 7.06 | 20.91 | 14.10 |
| SOLITARY | 45.41 | 15.38 | 45.45 | 13.41 |
| PARALLEL | 36.80 | 19.37 | 32.02 | 11.83 |
| COOP | 7.94 | 6.55 | 1.59 | 2.03 |
| **P.E. AREA** | | | | |
| NO PLAY | 24.80 | 30.07 | 29.56 | 14.15 |
| SOLITARY | 34.47 | 13.74 | 23.92 | 9.95 |
| PARALLEL | 36.14 | 17.34 | 40.97 | 12.80 |
| COOP | 4.48 | 4.72 | 5.54 | 6.75 |
| **ART AREA** | | | | |
| NO PLAY | 13.62 | 16.76 | 12.22 | 8.46 |
| SOLITARY | 33.66 | 21.69 | 28.76 | 15.47 |
| PARALLEL | 52.33 | 13.89 | 58.78 | 10.40 |
| COOP | .38 | .99 | .22 | .37 |
| **MISC.** | | | | |
| NO PLAY | 94.64 | 6.23 | 82.37 | 29.23 |
| SOLITARY | 4.18 | 4.26 | 8.18 | 11.21 |
| PARALLEL | 0.00 | 0.00 | 9.03 | 23.90 |
| COOP | 1.17 | 2.07 | .41 | 1.08 |
| **TABLEWORK** | | | | |
| NO PLAY | 32.66 | 42.75 | 20.11 | 5.61 |
| SOLITARY | 29.31 | 20.35 | 41.49 | 9.14 |
| PARALLEL | 32.09 | 23.32 | 38.31 | 9.55 |
| COOP | .95 | 1.30 | .06 | .16 |
| **MANIPULATIVE FLOOR PLAY** | | | | |
| NO PLAY | 28.15 | 23.20 | 23.99 | 12.21 |
| SOLITARY | 45.43 | 16.79 | 42.24 | 17.00 |
| PARALLEL | 24.57 | 18.81 | 31.14 | 15.17 |
| COOP | 1.83 | 2.39 | 2.57 | 2.88 |
| **FREE CHOICE** | | | | |
| NO PLAY | 16.47 | 12.09 | 27.52 | 13.99 |
| SOLITARY | 53.28 | 18.34 | 39.30 | 18.06 |
| PARALLEL | 28.60 | 20.16 | 31.79 | 7.27 |
| COOP | 1.641 | 3.40 | 1.38 | 2.42 |
| **MARGINAL MEANS** | | | | |
| NO PLAY | 32.16 | 15.33 | 30.96 | 7.15 |
| SOLITARY | 35.11 | 3.02 | 37.76 | 8.09 |
| PARALLEL | 30.08 | 11.42 | 34.58 | 7.12 |
| COOP | 2.63 | 1.83 | 1.68 | 1.32 |

T-1C3

Study 5C

## Table 7.13B

TYPE OF PLAY BEHAVIOR

| TYPE OF PLAY | N SUBJECTS (SEGREGATED SETTINGS) MEAN % | S.D. | N SUBJECTS (INTEGRATED SETTINGS) MEAN % | S.D. |
|---|---|---|---|---|
| SOLITARY PLAY | 38.93 | 6.81 | 36.49 | 8.69 |
| PARALLEL | 37.60 | 14.21 | 37.02 | 6.39 |
| COOPERATIVE | 2.04 | 2.02 | 1.99 | 1.62 |
| (NO PLAY) | 20.61 | 14.05 | 24.54 | 7.62 |

## Table 7.13C

F RATIOS FOR REPEATED MEASURES ANALYSES OF VARIANCE ON TYPE OF PLAY EXHIBITED BY SEGREGATED AND INTEGRATED HANDICAPPED PRESCHOOLERS IN VARIOUS CLASSROOM PLAY AREAS

| VARIABLES | INTEGRATED VS. SEGREGATED[1] |  | AREA[2] |  | INTERACTION[3] |  |
|---|---|---|---|---|---|---|
|  | F | p | F | p | F | p |
| NO PLAY | .04 | .8540 | 30.70 | .00 | 1.41 | .2216** |
| SOLITARY PLAY | .30 | .5952 | 12.91 | .00 | 1.27 | .2813** |
| PARALLEL PLAY | .73 | .3935 | 16.05 | .00 | .35 | .9104** |
| COOPERATIVE PLAY | 1.18 | .2932 | 5.53 | .0001 | 2.22 | .0510* |

[1] DF = 1.12 *p < .05

[2] DF = 6.72 **p < .01

[3] DF = 6.72

## Table 7.14A

PLAY BEHAVIOR OF HANDICAPPED PRESCHOOLERS
IN SEGREGATED AND INTEGRATED SETTINGS

| TYPE OF PLAY | N SUBJECTS (SEGREGATED SETTINGS) | | N SUBJECTS (INTEGRATED SETTINGS) | |
|---|---|---|---|---|
| | MEAN % | S.D. | MEAN % | S.D. |
| ISOLATE PLAY | 38.93 | 6.81 | 36.48 | 8.69 |
| NON ISOLATE PLAY | 40.44 | 16.01 | 39.02 | 5.49 |
| (NO PLAY) | 20.61 | 14.05 | 24.54 | 7.62 |
| PLAY | 79.37 | 14.05 | 75.49 | 7.59 |
| NO PLAY | 20.61- | 14.05 | 24.54 | 7.62 |

## Table 7.14B

F RATIOS FOR REPEATED MEASURES ANALYSES OF VARIANCE ON
ISOLATE AND NONISOLATE PLAY EXHIBITED BY SEGREGATED AND INTEGRATED
HANDICAPPED PRESCHOOLERS IN VARIOUS CLASSROOM PLAY AREAS

| VARIABLES | INTEGRATED VS. SEGREGATED[1] | | AREA[2] | | INTERACTION[3] | |
|---|---|---|---|---|---|---|
| | F | P | F | P | F | P |
| NO PLAY | .00 | .9888 | 44.56 | 0.** | 1.48 | .1970 |
| ISOLATE PLAY | .30 | .5914 | 12.95 | 0.** | 1.27 | .2793 |
| NON ISOLATE PLAY | .19 | .6686 | 22.36 | 0.** | .88 | .5120 |

[1] DF = 1,12    ** $P < .01$

[2] DF = 6,72

[3] DF = 6,72

## STUDY 6A: RELATIONSHIP BETWEEN PLAY AREAS AND SOCIAL INTERACTION/PLAY PATTERNS OF HANDICAPPED AND NONHANDICAPPED CHILDREN IN INTEGRATED PRESCHOOLS

(PI: Peterson)

Other studies reported by Peterson under the Kansas Early Childhood Research Institute have examined the degree of social integration achieved between handicapped and nonhandicapped children across various settings (classroom and playground). Integration has been assessed in relationship to the frequency of social contact between handicapped and nonhandicapped classmates, and the quality of their play with one another when compared to that of like-peers. Integration has also been examined from the standpoint of playmate preferences of H and NH children when they were in situations where certain types of classmates were available for interaction. While child preferences and behavior patterns may be the primary factors that influence social exchanges between children, there is evidence that play materials and toys also influence play and interactional patterns. For example, some toys are best manipulated by only one child. To expect two or more children to play simultaneously with them likely would thwart constructive play on the part of either one. Other toys or play materials are more conducive to group play, sharing, and cooperation. Wooden blocks and construction-type toys undoubtedly "set the stage" for more interaction to occur between children than a table work activity where children draw with paper and paints and are thus encouraged to work independently.

In order to understand some of the variables that influence social interaction patterns of children, one therefore cannot ignore the potential impact of toys and the environmental context in which play occurs. Are certain environmental conditions and the availablity of certain types of toys associated with (a) higher interaction rates among children, particularly handicapped and nonhandicapped classmates (b) differing types of play and social interaction, or (c) differing playmate preference patterns across various play areas? It was to these questions that the present research study was addressed.

Purpose. The purpose of this study was to determine if the quality and quantity of social interaction among handicapped and nonhandicapped children differed significantly according to the play area in which interactions occurred. Play areas included: play house or kitchen area, manipulative floor play, P.E. or gross motor play area, art or creative play area, and table work (or academic work area). Interactions of handicapped and nonhandicapped subjects who were being tracked during free play sessions were examined across the various play areas in regard to the frequency of interactions and the quality of interactions with (a) handicapped children only, (b) nonhandicapped children only, and (c) combinations of both handicapped and nonhandicapped children.

Subjects/Setting. Refer to description in Study 5A.

Data Collection. Data for this study was collected concurrently with data collection for Study 5B. Observations were made of special groups of handicapped and nonhandicapped subjects in integrated classrooms on a daily basis for approximately 8-10 weeks per subgroup of integrated peers. Using a time sampling observation strategy, data were collected on the basis of 30 second intervals to generate 20 intervals of data (or 10 minutes) per day per subject, five days a week. The Peterson Observation System for Social Interaction (1978) specified procedures for data collection on a complex array of variables. These variables and the data collection procedure are described under Study 5A and 5B and hence will not be repeated here.

Experimental Procedures/Design. Like previous studies, this study was descriptive in nature. It involved no experimental manipulation either of the preschool environment or of the procedures used during free play. Observations of selected handicapped and nonhandicapped children were taken during their free play sessions to identify play behavior and interactions that occurred within particular play areas where certain types of toys were available. Six procedures were applied to provide some standardization of the physical environment across the three research sites. This included the following: (a) the organization of play areas within the classrooms was standardized across sites, and materials that were to be placed in each area were specified; (b) boundaries of play areas at each site were clearly defined; (c) specified types of toys, materials, and equipment were pinpointed to be placed in certain areas; (d) play areas were rotated every other day so that three areas were available during any given free play period; (e) teacher/child ratios and teacher roles during free play time were standardized across sites; and (f) teacher reinforcement and contact rates were standardized across sites. A description of the classroom set-up in regard to play area is given in Studies 5A and 5B. Procedures there were the same as those used for this study.

Results. Extensive multivariate analyses have been made comparing the effects of play area and play materials upon (a) type of play exhibited by handicapped and nonhandicapped preschoolers, (b) playmate choices, (c) type of interaction, and (d) occurrences of occupied play and no play behavior. Some of these data have been shown in the results and data tables presented under Study 5B. Data will not be presented here, but the general findings are summarized below.

1. Play areas and toys/materials clearly influence play patterns of young children. Analyses of data in which types of play behavior were compared between handicapped and nonhandicapped subjects (by play area), revealed significant differences between areas ($p < .01$) in the amount of solitary, parallel, and cooperative play.

2. Significant differences were found in the amount of isolate/nonisolate play occurring across play areas by subjects.

3. Playmate preferences seemed influenced to some degree by play area. Overall trends were shown for nonhandicapped subjects to prefer like peers in areas requiring more skillful, agressive play (P.E. and manipulative floor play area) whereas greater levels of interaction between the two subgroups occurred in areas such as the housekeeping or kitchen area.

4. Handicapped and nonhandicapped children appeared to frequent the same play areas although handicapped children spent more time in areas that promoted more sedate forms of activity (e.g. table work area). Thus there were significant differences between handicapped and nonhandicapped subjects in the amount of solitary play exhibited. Handicapped subjects engaged in significantly more isolate behavior than did their normal peers -- more parallel and cooperative forms of play were observed in the nonhandicapped children and these forms of play were often exhibited in play areas such as manipulative floor, P.E., and kitchen.

In summary, results from this study would suggest that the environmental context in which play occurs and the nature of toys therein is a variable that influences how children play. To some extent it also alters playmate choices. Thus while child characteristics also affect interactional patterns, there is clearly an interaction between those characteristics and the environmental context in which children play. This would suggest that teacher strategies for altering social behavior of children could focus upon two types of approaches. One approach would be to alter environmental conditions and arrange the classroom setting by selecting toys/materials that are conducive to more interactional and cooperative forms of play. A second approach would be to affect a direct intervention with selected children by training desired prosocial behavior.

## STUDY 6B.1 SOCIAL INTERACTION AND PLAY BEHAVIOR OF HANDICAPPED AND NONHANDICAPPED CHILDREN IN A PLAYGROUND SETTING

(PI's: Peterson, Rettig, and Long)

The primary focus of this study was to gather descriptive information on the social and play behaviors of handicapped and nonhandicapped preschoolers in a playground free-play setting. Most studies to date have focused on the free-play behavior of children in integrated classrooms (Peterson & Haralick, 1977; Guralnick, 1981). However, to fully understand the dynamics of the social and play behaviors of integrated preschool children, it is important to examine such behaviors across different settings. Examining the behaviors of integrated handicapped and nonhandicapped preschoolers on a playground free-play setting is a logical extension of the study of their behaviors during free play classroom settings. In both settings, children are free to interact with whomever they wish, to play with whatever materials or equipment they choose, and to engage in their own unique forms of play activity.

A playground free play setting introduces environmental variables that are quite different from those in a classroom. First, the very nature of playground free play is to exert energy -- to run, climb, and explore in ways not possible in the classroom. Playground settings will also typically offer more open space in which children can play and interact. Second, the play equipment and materials found on playgrounds is quite different than that found in classrooms. Play equipment on the playground will, by necessity, foster more physical activity by children. Whereas a child's classroom free time may include make believe kitchen props, art activities, or block play, an outdoor play period will provide opporutnities to run, climb, or spin on a merry-go-round. Given these differences in environmental variables it is quite possible that the types of play and social interactions of children will also vary.

The following group of studies focuses specifically on playground social and play behaviors of integrated handicapped and nonhandicapped preschool children. Specifically, information will be provided describing the type and extent of play behaviors and interactions of handicapped and nonhandicapped children in a playground free play setting (study 6B.1), a comparison of play and social behaviors of handicapped and nonhandicapped children in a playground and classroom setting (study 6B.2), and finally, a description of the play behaviors of a specific subpopulation of handicapped children in a playground setting (study 6B.3).

Purpose. The purpose of this study was to examine the patterns of play and social interaction among handicapped and nonhandicapped preschool children outside of the classroom in the playground free play environment. The primary purpose of this investigation was to determine if patterns of play and social interactions between children differ when the environmental conditions and play opportunities in which they occur differ. The frequency of interaction, the types of interaction, and the playmate selections made under various playmate availability conditions that occurred spontaneously on the playground were analyzed in this study.

Subjects. Subjects for this study involved four handicapped children (two boys and two girls), selected from the Special Education Early Intervention Program, Haworth Hall, the University of Kansas. Mean age of the handicapped subjects was 5.6 years. Mean age for the nonhandicapped children was 4.8 years. The handicapped subjects exhibited severity levels of disability in the mild to moderate range. Nonhandicapped subjects displayed no physical or mental abnormalities. Subjects were matched as closely as possible across age, sex, and length of time in the program.

Setting. This study was conducted on a playground located on the University of Kansas campus. The playground was a 95' x 39' fenced section enclosing a grass covered, hilly play area with a small asphalt area designed for young children. It contained an assortment of play equipment that defined specific play areas. These included:

teeter totters

bouncing animals

sand box

bounce board

slippery slide with adjacent access tower

climbing tower

roller tank

swings (included one tire swing and two wooden seat swings)

merry-go-round

make believe props (included a picnic table and three mushroom shaped props)

climbers (included trees, domes, bridges, ladders, tires, or any other piece of equipment that children could use for climbing)

equipment (included such items as wagons, tricycles, or balls which could be used on an asphalt area)

miscellaneous (included all space in between all other play areas)

Each of these 13 play areas was specifically defined by the major piece of equipment in that area. Boundaries were established around each defined play area for purposes of data collection.

The social environment of the playground setting included a total of 28 children who were all students of one of two experimental early intervention programs at the University of Kansas. Both classrooms were on the playground for the same 30-minute free play period. Of the 28 children on the playground, 60% were handicapped and 40% were nonhandicapped models. Of the handicapped children, 30% were classified as mildly handicapped, 60%

174

as moderately handicapped, and 10% as severely handicapped. Both classrooms were noncategorical and contained children with all types of handicapping conditions.

Experimental Design/Procedures. No experimental manipulation occurred in this study since its purpose was to study spontaneous social interactions and play activity among the observed subjects. The spontaneous play and social interaction data were recorded by six observers over a period of approximately 10 weeks. Each observer was responsible for taking data on two subjects daily, one handicapped and one nonhandicapped child. To avoid potential observational biases, a 10-day rotation schedule was utilized -- with each observer recording data on all the subjects in the study an approximately equal number of times.

Observations were collected in alternating five-minute blocks using the 30-second observation procedure. Each observer watched and recorded data on one subject for five minutes, switched to the second subject for five minutes, returned to the first subject for five minutes, and finally, returned to the second child for five minutes. Thus, 20 minutes of data were recorded daily consisting of a total of 10 minutes of observational data apiece for each subject.

Because the descriptive nature of this study required that children be allowed to engage in unrestricted free play behavior, subjects received no special instructions. Teachers simply conducted outdoor play time using their usual procedures. This meant teachers provided general supervision, assisted children when they needed help, and reinforced play activities. They did not enter into direct play with children, but rather left children free to move about and engage in their own choice of outdoor play. In addition, observers were required to remain as inconspicuous as possible and avoid interaction with the children. Teachers were also encouraged to keep their interventions at a minimum to allow outdoor time to continue as an unstructured, free choice play activity.

Data Collection. Data on handicapped and nonhandicapped subjects were collected using a time-sampling observation code. This code is an adaptation of the Peterson Preschool Observation System for Social Intervention (1978) for use in recording social interactions within integrated preschool classrooms. Peterson's code was adapted for use in the playground setting by redefining the play areas from classroom areas to playground areas. Basic information obtained by both the playground and classroom versions of the code remained essentially the same.

The observation code allowed for the recording of a variety of social and play interactions. Data were collected on each subject individually. The code utilized a 30-second observation interval that was divided into two 15-second periods. The first 15 seconds were used for the observation of social and play behavior, while the second 15-second interval was used for recording the data. The observation code allowed for classificiation of the following items of information:

1. Play Area. Data were obtained by noting in which playground area the observed child was located (e.g., teeter totters, bouncing animals, climbing tower, etc.). Classification within a specific playground area required that the child be within that "area" for the greater portion of the 15-second observation interval (eight or more seconds).

2. Count and Categorization (handicapped or nonhandicapped). This involved a count of the children and adults who were potentially available for interaction with the observed child. It included an actual count of the number of handicapped and nonhandicapped children as well as adults or teachers in, on, or touching the play area in which the observed child was located. The observed child was not included in the count within an area.

3. Type of Play. The type of play in which the observed child engaged was broken down into four categories.

   a. No play - This included those intervals in which the observed child was not engaged in any play activity with a piece of play equipment or another child.

   b. Solitary play - Solitary play occurred during those intervals in which the observed subject was engaged in independent play activity and had no interaction with other children.

   c. Associative/Parallel play - This involved those instances in which the observed subject was playing next to or beside another child(ren) who was/were also in play with materials or equipment from the same play area. Parallel play requires that the children not play together, yet be close enough (i.e. less than three feet apart) to be aware of each others' presence.

   d. Cooperative play - Cooperative play involved true interaction in which the observed child engaged in play with another child in a mutual give and take activity. This included such activities as giving, handing, or cooperatively throwing back and forth, helping another child build a single block structure, working together on the teeter totter to make it go back and forth, and swinging in which one child rides and the other pushes.

4. Playmate Designation. This category involved a designation of "with whom" the observed subject had interaction. Thus, it included no interaction, interaction solely with handicapped peer(s), interaction exclusively with nonhandicapped peer(s), or a combination of both.

5. Time-Out Intervals. "Time-out" intervals were recorded during those periods in which the observed subject was unavailable for play (e.g., going to the bathroom, getting a drink, any time-out or punishment procedure, etc.).

Results. Specific analysis of data collected in this study was examined through broad research questions.

1. Were differences present between groups in the frequency of time in defined playground play?

Mean averages were compiled for each group of subjects on the frequency of time spent in each of the 13 specific play areas. Data in Table 7.21 reveal that both groups of subjects spent similar amounts of time in the same play areas. Data in Table 7.21 also indicate that certain play areas were much more frequented by both groups of subjects than others. Subjects spent similar amounts of time in the same play areas. Data in Table 7.21 also indicate that certain play areas were much more frequented by both groups of subjects than others. These areas included the miscellaneous, climbers, merry-go-round, swings, and sandbox areas. No significant differences were noted between groups in amount of time spent in specific areas.

2. Were differences present between groups in the types of play behavior exhibited in the playground setting?

Table 7.22 indicates that the only significant difference between the handicapped and nonhandicapped subjects occurred in the frequency of time spent in solitary play. Mean percentages for handicapped subjects for solitary play were found to be significantly different from those obtained for nonhandicapped subjects ($t = 2.74$, $df = 6$; $p <$ .05). Differences between groups on frequency of time engaged in no play and parallel was only 6%. Frequency of time engaged in cooperative interactions was almost identical between groups. The most frequent form of play for nonhandicapped children was observed to be parallel play. Solitary play was observed as the most frequent for handicapped subjects.

3. Were significant differences present between groups in the type of playmates with whom subjects interacted?

Data summarized in Table 7.23 by mean percentages for each group shows that "no one" was selected for play most frequently by both groups (63.25% for handicapped and 58.0% by nonhandicapped). When different types of playmates were selected for interaction by subjects, a trend toward interaction with like peers becomes apparent. Handicapped playmates were selected for interaction significantly more often by handicapped subjects than by nonhandicapped subjects ($p <$ .05; $t = 2.93$, $df = 6$). In contrast, nonhandicapped subjects were observed in interaction with nonhandicapped peers significantly more often than were handicapped subjects ($p <$ .05; $t = -2.54$; $df = 6$). These results present a clear preference for interaction with nonhandicapped peers by nonhandicapped subjcts, especially since nonhandicapped children were in the minority in the playground free play period.

4. Were differences present between groups on the type of playmate selected for interaction within selected play areas?

   Table 7.24 summarizes the mean percentage figures for each group of subjects, across the six most frequented play areas, by who was selected for play or interactions. Only two significant differences between groups were found. These differences both occurred in the frequency of interactions with nonhandicapped peers by nonhandicapped subjects within two different play areas, sand box and climbers. In each instance, nonhandicapped subjects interacted significantly more often with nonhandicapped peers than did the handicapped subjects (sandbox t = -2.98, df = 6; climbers t = -2.53, df = 6). Although not significant, the trend of play with like peers is apparent in each of the other four areas by both groups of subjects.

5. Were differences present between groups of subjects on who was selected for play given certain availability conditions?

   Three specific playmate availability conditions were present for each child on the playground: handicapped children only available as playmates, nonhandicaped children only available as playmates, or a combination of handicapped and nonhandicapped children available as playmates. No significant differences in type of play by each group was found, though the trend of play with like peers was noted when a combination of playmates were available.

Discussion. This study was designed to gather descriptive information on the play and social behaviors of integrated preschoolers in a free play playground setting. In general, these results indicated that handicapped children are quite similar to nonhandicapped children in the nature and extent of their play interactions. It was found that nonhandicapped children do exhibit distinct preferences for intervention with other nonhandicapped peers. This preference was especially pronounced given the limited number of nonhandicapped children available as potential playmates (40%). Data did not indicate that handicapped children were totally excluded from interactions with their nonhandicapped peers. However, the low frequency of interactions between handicapped and nonhandicapped subjects (10%) strongly suggests that intervention procedures are essential to foster and maintain interactions between the two groups of children.

## Table 7.21

### PLAY AREAS WHERE HANDICAPPED AND NONHANDICAPPED SUBJECTS SPENT THEIR TIME - PLAYGROUND

| | HANDICAPPED | | NONHANDICAPPED | | | |
|---|---|---|---|---|---|---|
| | MEAN PERCENT | SD | MEAN PERCENT | SD | t | p |
| Teeter-Totter | .75 | .96 | 1.50 | 2.38 | - .58 | N.S. |
| Bouncy Animals | .75 | 1.50 | .25 | .50 | .63 | N.S. |
| Sand Box | * 11.75 | 8.42 | 7.25 | 10.63 | .66 | N.S. |
| Bounce Board | -0- | -0- | -0- | -0- | ---- | ---- |
| Slippery Slide | 3.50 | 1.73 | 4.00 | 2.83 | - .30 | N.S. |
| Climbing Tower | 5.00 | 4.69 | 3.00 | 2.16 | .77 | N.S. |
| Roller Tank | 1.75 | 1.71 | 3.00 | 1.83 | -1.00 | N.S. |
| Swings | * 13.50 | 13.18 | * 11.50 | 9.98 | .24 | N.S. |
| Make Believe | .25 | .50 | .75 | .96 | - .93 | N.S. |
| Merry-Go-Round | * 16.75 | 13.55 | 9.75 | 6.40 | .93 | N.S. |
| Climbers | * 21.25 | 6.85 | * 20.75 | 6.65 | .10 | N.S. |
| Equipment | .25 | .50 | 1.25 | 1.26 | -1.48 | N.S. |
| Miscellaneous | * 24.50 | 6.46 | * 37.00 | 12.03 | -1.83 | N.S. |

HS90

* indicates most frequented areas

Study 6B.1

## Table 7.22

### TYPES OF PLAY BEHAVIOR EXHIBITED BY HANDICAPPED/NONHANDICAPPED SUBJECTS IN PLAYGROUND SETTING

| | PLAYGROUND | | |
|---|---|---|---|
| | Mean Percent | SD | t |
| NO PLAY | | | |
| Handicapped | 26.00 | 4.08 | -1.47 |
| Nonhandicapped | 32.00 | 7.07 | |
| SOLITARY | | | |
| Handicapped | 37.25 | 4.11 | 2.74* |
| Nonhandicapped | 26.00 | 7.12 | |
| PARALLEL | | | |
| Handicapped | 30.50 | 3.32 | -1.69 |
| Nonhandicapped | 36.00 | 5.60 | |
| COOPERATIVE | | | |
| Handicapped | 6.25 | 2.36 | .15 |
| Nonhandicapped | 6.00 | 2.45 | |

* $p < .05$

## Table 7.23

### PLAYMATE TYPES WITH WHOM HANDICAPPED/NONHANDICAPPED SUBJECTS INTERACTED IN PLAYGROUND SETTING (WITHOUT REGARD TO AVAILABILITY)

| PLAYMATE TYPES SELECTED | PLAYGROUND | |
|---|---|---|
| | MEAN PERCENT | SD |
| **NO ONE SELECTED** | | |
| Handicapped | 63.25 | 2.22 |
| Nonhandicapped | 58.00 | 4.83 |
| **HANDICAPPED PLAYMATES SELECTED** | | |
| Handicapped | 21.25 | 2.36 |
| Nonhandicapped | 10.00 | 7.17 |
| **NONHANDICAPPED PLAYMATES SELECTED** | | |
| Handicapped | 8.75 | 5.32 |
| Nonhandicapped | 23.50 | 10.34 |
| **COMBINATION PLAYMATES SELECTED** | | |
| Handicapped | 20.50 | 25.21 |
| Nonhandicapped | 8.50 | 5.00 |

Table 7.24

## COMPARISON BETWEEN HANDICAPPED AND NONHANDICAPPED SUBJECTS ON TYPE OF PLAYMATE SELECTED WITHIN EACH PLAY AREA - PLAYGROUND

| PLAY AREAS AND PLAYMATE TYPES | HANDICAPPED SUBJECTS |  | NONHANDICAPPED SUBJECTS |  | t | p |
|---|---|---|---|---|---|---|
|  | MEAN PERCENT | SD | MEAN PERCENT | SD |  |  |
| MERRY-GO-ROUND |  |  |  |  |  |  |
| No One | 20.50 | 7.14 | 12.50 | 13.72 | 1.03 | NS |
| Handicapped Playmate(s) | 21.00 | 15.12 | 20.75 | 14.18 | .02 | NS |
| Nonhandicapped Playmate(s) | 1.50 | 2.38 | 22.25 | 23.82 | -1.73 | NS |
| Combination Playmate(s) | 57.00 | 17.68 | 44.50 | 11.79 | 1.18 | NS |
| SLIPPERY SLIDE |  |  |  |  |  |  |
| No One | 60.75 | 13.43 | 38.75 | 34.79 | 1.18 | NS |
| Handicapped Playmate(s) | 21.50 | 12.26 | 10.75 | 12.58 | 1.22 | NS |
| Nonhandicapped Playmate(s) | 17.75 | 10.81 | 24.25 | 21.85 | - .53 | NS |
| Combination Playmate(s) | -0- | -0- | 26.25 | 35.54 | -1.61 | NS |
| SWINGS |  |  |  |  |  |  |
| No One | 33.75 | 32.97 | 26.25 | 13.00 | .42 | NS |
| Handicapped Playmate(s) | 34.00 | 32.78 | 29.50 | 21.36 | .23 | NS |
| Nonhandicapped Playmate(s) | 31.50 | 46.25 | 43.50 | 20.60 | - .47 | NS |
| Combination Playmate(s) | .50 | 1.00 | .75 | 1.50 | - .28 | NS |
| SAND BOX |  |  |  |  |  |  |
| No One | 55.25 | 32.22 | 17.00 | 23.11 | 1.93 | NS |
| Handicapped Playmate(s) | 37.50 | 29.29 | 12.50 | 10.79 | 1.60 | NS |
| Nonhandicapped Playmate(s) | .75 | .96 | 54.50 | 36.01 | -2.98 | *.05 |
| Combination Playmate(s) | 6.25 | 5.85 | 15.75 | 14.10 | -1.24 | NS |
| CLIMBERS |  |  |  |  |  |  |
| No One | 79.28 | 12.09 | 61.00 | 17.46 | 1.72 | NS |
| Handicapped Playmate(s) | 10.25 | 8.54 | 6.25 | 4.03 | .85 | NS |
| Nonhandicapped Playmate(s) | 8.00 | 4.97 | 28.75 | 15.65 | -2.53 | *.05 |
| Combination Playmate(s) | 2.50 | 3.00 | 4.00 | 4.69 | - .54 | NS |
| MISCELLANEOUS |  |  |  |  |  |  |
| No One | 96.00 | 2.58 | 93.25 | 4.92 | .99 | NS |
| Handicapped Playmate(s) | 2.50 | 3.32 | .75 | .96 | 1.10 | NS |
| Nonhandicapped Playmate(s) | 1.25 | 2.50 | 4.75 | 5.12 | -1.23 | NS |
| Combination Playmate(s) | -0- | -0- | 1.00 | 1.41 | -1.41 | NS |

## STUDY 6B.2: A COMPARISON OF PLAY BEHAVIOR AND SOCIAL INTEGRATION AMONG HANDICAPPED AND NONHANDICAPPED PRESCHOOLERS ACROSS PLAYGROUND AND CLASSROOM FREE PLAY ENVIRONMENTS

(PI: Peterson)

As mainstreaming and integrated programs have gained greater popularity as alternative approaches to early intervention, researchers have begun to examine the social dynamics among handicapped and nonhandicapped children in integrated settings. To what extent the physical integration of such preschoolers in one classroom results in actual social integration has been of concern. Studies conducted on this issue have focused upon spontaneous social interactions of children in the classroom environment during free play activities. Preliminary findings suggest that preschoolers do not interact indiscriminately with all children in their classroom, but instead begin early to show preferences for certain playmates. Peterson and Haralick (1977) found that the nonhandicapped children in the integrated preschool setting, where their study was conducted, tended to select each other as sole playmates much more frequently than they selected handicapped peers as a sole playmate. Similar results were reported in a study by Porter, et al. (1978), who found that normally developing children maintained closest mean proximity to like-peers, (i.e. normally developing classmates). They also engaged in various types of social behavior with other normal peers (i.e. vocalizations, manipulation of objects, movement patterns) more often than with retarded classmates.

Guralnick (1980) examined social interactions among preschool children who represented different developmental levels (i.e. nonhandicapped, mildly handicapped, moderately handicapped, and severely handicapped). Results indicated that (a) nonhandicapped and mildly handicapped groups interacted significantly more often with each other than expected on the basis of availability, and less frequently than expected with moderately and severely handicapped peers; and (b) moderately and severely handicapped children interacted with all groups generally at frequencies corresponding to their availability.

While this research literature raises some question about the social dynamics within mainstreamed settings, it should be stressed that this research has focused only on social integration within one environment -- the preschool classroom. In order to fully evaluate the effectiveness of integrated classrooms for promoting social integration, social interaction within other preschool environments needs to be examined. The preschool playground provides a very effective additional environment in which to evaluate social interaction. By comparing social interaction patterns found in the classroom with those found on the playground, the consistency of interaction styles between the two environments can be measured. That is, it can be determined if social interaction patterns are the same within both preschool environments or if the environment that the child is in affects his/her social interaction patterns. In addition, other ecological variables related to the setting wherein the activity occurs (such as the physical surroundings, the materials/equipment available, or the nature of the play activity itself) can be examined as to their effect upon the social interaction taking place between handicapped and nonhandicapped preschoolers.

Purpose. The purpose of this study was to examine the social interactions and playmate preferences of handicapped and nonhandicapped preschoolers across two different free-play environments -- the classroom and the playground.

Subjects. Eight children enrolled in an integrated preschool intervention program served as subjects. The eight subjects included four handicapped (H) subjects and four nonhandicapped (NH) subjects. Each subgroup contained two males and two females. The H subjects ranged in age from 5-0 to 6-5 years and the NH subjects from 4-6 to 5-2 years. The H group were all children with Down's Syndrome, three of whom were moderately retarded and one mildly retarded.

Setting. Playmate preferences of the H and NH subjects were examined daily across two different free-play environments: (a) in the classroom during a half-hour free-play time when the children first arrived at preschool, and (b) on the playground where outdoor free-play occurred. Physical features of these environments were as follows.

The 31' x 18' classroom was divided into play areas or centers where play materials and equipment appropriate to the area were available. Three centers containing materials, which varied from session to session, were set up each day and made available to the children. Play areas were also systematically rotated throughout the study so that one set of 3 play areas (called rotation 1) was available on one day and a second set of play areas (rotation 2) was available the next day. Play areas included: a table work area for cognitive/preacademic activities; a manipulative floor play area for blocks, cars or trucks, and other construction/manipulative types of toys; a gross motor area containing equipment such as an indoor area for blocks, cars or trucks, and other construction/manipulative types of toys; a gross motor area containing equipment such as an indoor slide, rocking boat, bowling game, large hollow balls, etc.; an art area with paints, paper and crayons, clay, and other art/creative materials; and a free choice area containing books, puppets, flannel-board and other look-at materials.

The playground was a 95' x 39' fenced section enclosing a grass covered, hilly play area and an asphalt area designed for young children. It contained an assortment of play equipment that allowed a designation of play areas parallel to that described for the classroom. This included areas with teeter-totter, bouncing animals, sand box, bounce board, slide, log roll, swings, a make believe area with toad stools and tables, a merry-go-round, and several climbers.

As for the social environment of the two settings, the preschool classroom contained a total of 17 children, eight of whom were observed for this study. Of the 17 children, 60% were handicapped, and 40% were nonhandicapped models. On the playground, a second group of 11 children from another integrated classroom joined the preschool class. This second class contained the same 60%-40% proportion of H to NH children. The severity of disability represented in both classes was similar. Approximately 30% were designated as mildly handicapped, 60% as moderately handicapped, and 10% as severely handicapped. Children from the two classes were familiar with each other and when combined for playground time, were allowed to mix and play as they wished.

Experimental Design. No experimental manipulations were performed in this study. It was designed as a descriptive study on "social behavior of young children in integrated preschool settings. Children were simply observed using the 30-second observation instrument developed by Peterson (1978).

Data Collection/Procedure. Data collection procedures for this study involved daily observations of each H and NH subject using a portion of the Peterson Preschool Observation System for Social Interaction (1978). This observation code was developed to record social behavior of children in mainstreamed/integrated classroom settings on the basis of 30 second time intervals. It was adapted for playground use for this study. Major variables on which data were derived were:

> Play area in which the observed subject was engaged within the classroom or on the playground (e.g. art area in the classroom, or climbers on the playground).
>
> Available playmates within the same play area as the observed subject. A count was taken of available peers during each 30 second time interval allowing for the categorization of available playmates as H only, NH only, or a combination of H and NH.
>
> Type of interaction in which the observed subject was engaged. Recording of playmate selections implied that a subject was engaged in play. Hence a determination was made as to whether a subject was engaged in no play, isolate or solitary play, or nonisolate forms of play.
>
> Playmate selection as indicated by a designation of the type of peer(s) with whom the observed subject came into contact when engaging in nonisolate play. Possible recordings relating to this variable included: (a) no playmate selection, as in isolate play, (b) interaction with a handicapped peer(s), (c) interaction with a nonhandicapped peer(s), or (d) interaction with a combination of H and NH peers. A playmate "selection" was inferred when a subject voluntarily moved into physical proximity with another peer (defined as next to or within a 3 foot proximity provided that the children were at an angle where they could see one another), and engaged simultaneously in parallel, associative, or cooperative forms of play behavior.

Using this observation code, data were collected simultaneously on subjects in both the classroom and playground environments on a daily basis for 9½ weeks. Each observer tracked two subjects daily by observing one subject for five consecutive minutes, observing a second one for the next five minutes, and then repeating the same sequence to obtain a second five-minute sample on each subject. This resulted in a total of ten minutes of daily data for each subject for each of the two free play environments. Over the 9½ week period, this produced a potential of over 1,500 independent intervals of data or approximately 6½ hours of 30-second interval data for each subject.

Results. Data collected for this study were clustered and analyzed to provide comparisons on the type of play and social behaviors of nonhandicapped and handicapped children in two different settings, playground and classroom. This data provided for the following comparisons:

1. Types of play exhibited by handicapped and nonhandicapped children in playground and classroom settings.

   In both the classroom and playground settings, handicapped subjects were observed in no play more often than their nonhandicapped peers. The mean percentage of no play was also found to be greater in the playground setting than in the classroom. In contrast, mean percentage of time engaged in solitary and parallel play was found to be greater in the classroom setting for both groups of subjects (5% to 11%). Mean percentage of time engaged in cooperative play was similar by both groups (3.50% for handicapped children vs. 3.25% for nonhandicapped children in the classroom). However, both groups of children engaged in slightly more cooperative play on the playground (6.85% for handicapped vs. 6.0% for nonhandicapped).

2. Playmate types with whom handicapped and nonhandicapped subjects interacted in playground and classroom settings.

   Data were analyzed in regard to who was selected for interaction without regard to any availability conditions. In both the classroom and playground settings, handicapped and nonhandicapped subjects played in isolation more often than with their peers. In both settings nonhandicapped subjects were observed in interaction with nonhandicapped peers more frequently than were the handicapped subjects. This difference was only significant, however, in the playground area. In both settings, handicapped subjects were observed interacting with other handicapped children more frequently than their nonhandicapped peers. Again, this difference was significant only in the playground setting.

3. Playmate selections across the two free-play environments by each subject group (NH and H) when all playmate options were available.

   The purpose of this analysis was to determine whether the type of setting resulted in different social preferences. Table 7.25 summarizes descriptive data in regard to the mean percentages with which various playmate selections were made by NH and H subjects on the playground and in the classroom. Several significant findings are as follows:

   a. Both H and NH subjects engaged in isolate play in the classroom more often than on the playground.

   b. Circumstances in which both H and NH subjects selected combinations of playmates occurred significantly more often on the playground than in the classroom.

   c. The frequency with which H selected NH playmates was significantly different across the two environments. Handicapped subjects selected NH peers as sole playmates significantly more often in the classroom than on the playground. Playmate selections of NH subjects when all peer options were available were not significantly different across the two settings.

4. Playmate selections by NH and H subjects under each of three peer availability conditions.

The purpose of this analysis was to determine whether preferences differ between the two groups. Comparisons were made between the two subject groups on classroom data and on playground data. The three playmate availability conditions under which data were clustered included: (a) NH peers available only, (b) H peers available only, and (c) combination of NH and H available.

Peer preferences of NH and H subjects under each of these conditions are summarized for the classroom in Table 7.26. Similar data for the classroom are shown in Table 7.27. Significant results from these comparisons can be summarized in the following manner:

Classroom

1. Handicapped subjects were more likely to pick no one when only one playmate type was available.
2. When NH peers were present in the same area as the observed NH subjects, their interactions were distributed approximately 50-50 between no playmate selection and interaction with the normally developing peers(s). When only handicapped peers were available to the NH subjects, no one was selected more often than the H peer.
3. When combination playmates were available, both the NH and the H subjects selected like peers significantly more often than unlike peers.

Playground

1. When only one type of playmate was available both H and NH subjects were more likely to interact with someone than to engage in isolate forms of play.
2. When all playmate options were available on the playground, combinations of peers were selected most frequently by both the NH and H subjects.
3. As was true in the classroom, when combination playmates were available, both the NH and the H subjects selected like peers significantly more often than unlike peers.

Discussion. In general the data suggest several observations concerning the social interaction of integrated groups of young children across classroom and playground settings. First, results indicated that higher rates of interaction among both H and NH subjects occurred on the playground than in the classroom. A possible explanation for this is that the equipment on the playground promoted closer association among children and thus increased the probability that playmates would be selected. Second, the data suggests that while social integration is occurring in the sense that NH and H peers did play with one another, so were preferences manifest for like-peers.

When all combinations of peers were available both on the playground and in the classroom, both subject groups selected a like-peer more frequently than an unlike peer. Third, results indicated that the greatest amount of social isolation occurred in the classroom as opposed to on the playground. As with the playground, the nature of the play materials might be a factor influencing the type of play taking place. Classroom materials do not, by their very nature, require as much mutual play. In fact, many materials are more easily manipulated by a single child, making it less advantageous for children to share or assist each other in play.

Although the generalizability of this study is somewhat limited by the small number of subjects and the presence of uncontrolled intervening variables, results of this study give added strength to the proposition that: (a) social integration of H and NH children is not an inherent outcome of a mainstreamed or integrated preschool program. Social integration may be affected by a variety of physical and social conditions that promote or hamper chances that NH and H youngsters will seek out one another for play; (b) teachers need to be alert to ways they can encourage positive forms of mutual association on the playground and in the classroom. Activities should be planned in ways that take into account the social dynamics that are likely to evolve among integrated peer groups in the particular environmental setting. By doing so, perhaps they can foster social clustering of subgroups in ways that promote the goals of mainstreaming.

## Table 7.25

Comparison of playmate selections under conditions when *all* peer options were available across playground and classroom environments

| | Classroom | | Playground | | |
|---|---|---|---|---|---|
| | Mean % | S.D. | Mean % | S.D. | t |
| Handicapped Subjects' Playmate Selections | | | | | |
| No one | 48.3 | 4.1 | 23.8 | 13.1 | 3.14* |
| NH only | 16.1 | 2.5 | 3.3 | 2.4 | 8.22** |
| H only | 22.8 | 7.1 | 19.9 | 6.7 | .49 |
| Combination (NH & H) | 12.7 | 1.7 | 53.1 | 15.5 | -4.86* |
| Nonhandicapped Subjects' Playmate Selections | | | | | |
| No one | 39.3 | 11.5 | 18.9 | 4.3 | 3.03* |
| NH only | 35.2 | 13.3 | 26.8 | 17.7 | .67 |
| H only | 11.5 | 6.0 | 6.2 | 3.5 | 2.30 |
| Combination (NH & H) | 13.9 | 6.6 | 48.2 | 20.0 | -3.85* |

* p < .05 df = 3
** p < .01

## Table 7.26

Comparison of nonhandicapped and handicapped subjects' playmate selections across various availability conditions

-- Classroom Setting --

| Availability Conditions | Handicapped Subjects Mean % | S.D. | Nonhandicapped Subjects Mean % | S.D. | t |
|---|---|---|---|---|---|
| NH Available | | | | | |
| No one selected | 62.0 | 2.2 | 49.1 | 18.3 | 1.54 |
| NH selected | 37.7 | 2.2 | 50.9 | 18.3 | 1.54 |
| H Available | | | | | |
| No one selected | 59.8 | 5.6 | 58.8 | 18.4 | 0.10 |
| H selected | 38.7 | 5.6 | 41.2 | 18.4 | 0.10 |
| Combination Available | | | | | |
| No one selected | 48.3 | 4.1 | 39.3 | 11.5 | 1.47 |
| NH selected | 16.1 | 2.5 | 35.2 | 13.3 | -2.77* |
| H selected | 22.8 | 7.1 | 11.5 | 6.0 | 2.42* |
| Combination selected | 12.7 | 1.7 | 13.9 | 6.6 | -0.29 |

* $p < .05$ df = 6

## Table 7.27

### Comparison of handicapped and nonhandicapped subjects' playmate selections across availability conditions

### -- Playground --

| Availability Conditions | Handicapped Subjects Mean % | S.D. | Nonhandicapped Subjects Mean % | S.D. | t |
|---|---|---|---|---|---|
| NH Available Condition | | | | | |
| No one selected | 46.1 | 16.4 | 30.8 | 11.3 | 1.53 |
| NH selected | 51.8 | 16.4 | 66.8 | 11.3 | 1.53 |
| H Available Condition | | | | | |
| No one selected | 32.1 | 11.9 | 22.8 | 5.1 | 1.47 |
| H selected | 67.7 | 11.9 | 76.8 | 5.1 | 1.47 |
| Combination Available | | | | | |
| No one selected | 23.8 | 13.1 | 18.9 | 4.3 | 0.69 |
| NH selected | 3.3 | 2.4 | 26.8 | 17.7 | -2.63* |
| H selected | 19.9 | 6.7 | 6.2 | 3.5 | 3.57* |
| Combination selected | 53.1 | 15.5 | 48.2 | 20.0 | 0.39 |

* $p < .05$   df = 6

## STUDY 6B.3 SOCIAL INTERACTIONS AMONG DOWN'S SYNDROME AND NONHANDICAPPED PRESCHOOLERS ON THE PLAYGROUND

(PI's: Peterson and Rettig)

This study was designed to examine the social integration of a specific subpopulation of handicapped children with their nonhandicapped peers during outdoor free play time on the playground. Specifically, the study examined the nature and extent of social interactions among Down's Syndrome preschool children and their nonhandicapped preschool-aged peers who attended an integrated early intervention program. In most research reported to date, interactions have not been analyzed in regard to particular subgroups of handicapped children within an integrated classroom setting. Analysis of interactions among particular subgroups of handicapped children is important for two reasons: (a) it seems unlikely that all handicapped children will have the same degree of success in the integrated setting, and (b) it seems unlikely that all nonhandicapped children will develop the same degree of acceptance and understanding for children with different handicapping conditions.

Down's Syndrome children, as a specific subpopulation of handicapped children, were chosen for this study for three reasons. First, they are a population often found in preschool intervention settings. It has been indicated that one of the most common causes of moderate and severe mental retardation is Down's Syndrome (Blackhurst & Berdine, 1981). Second, little research information is available regarding the social behavior of young Down's Syndrome children, or on the social behavior of Down's Syndrome preschool children in integrated settings. Most studies reported to date have only been concerned with school-aged Down's Syndrome children (Moore, et al., 1968; Scholottman & Anderson, 1979; Benda, 1969). In general, these studies have supported the stereotype of Down's Syndrome children as happy, friendly and affectionate children. However, whether this stereotype holds true for young Down's children has not been examined. Third, Down's Syndrome children may be likely candidates for integration since they display no overt physical stigmata. Although Down's children generally do display a characteristic facial appearance (epicantal folds, hypertelerism), this appearance does not particularly distinguish them as significantly different from nonhandicapped children -- at least from a child's point of view.

Purpose. The purpose of this study was to examine the spontaneous play and social behaviors of four Down's Syndrome preschool-aged children and four preschool-aged nonhandicapped children on a free-play playground setting. Specifically, this study was designed to determine (a) if significant differences were present in the overall frequency of play by the Down's Syndrome and nonhandicapped children, (b) if significant differences were present between the two groups in the frequency of time spent in specific play areas, (c) if significant differences were present with whom each group of subjects engaged in interaction, and (d) if significant differences were present between groups by what type of play occurred with certain playmates available.

Subjects. Subjects for this study included four Down's Syndrome children and four nonhandicapped children. The Down's Syndrome subjects included two boys and two girls who all exhibited retardation in the moderate range.

Mean age for the Down's Syndrome subjects was 6.2 years. The nonhandicapped group of subjects also included two boys and two girls. Mean age for the nonhandicapped group of subjects was 4.8 years. The nonhandicapped subjects displayed no physical stigmata. Children in both groups were matched as closely as possible in regard to age, sex, and length of time in the intervention program. All subjects were enrolled in the experimental early intervention classrooms at the University of Kansas.

Setting. This study was conducted on a playground located on the University of Kansas campus. The playground measures 95' x 39' and has slight uphill slant. The playground is fenced in, and is generally grass covered. It contains an assortment of play equipment including a teeter-totter, sand box, slide, log roll, merry-go-round, climbers, swings, and bouncing animals. A total of 13 play areas were defined for this study.

A total of 28 preschool-aged children were available on the playground during each play period. Of these 28 children, 60% were handicapped and 40% were nonhandicapped models. (A more detailed description of the social environment is provided in section 6B.1.)

Experimental Design/Procedures. No experimental procedure or condition was utilized since this study was designed to provide descriptive information regarding the social and play behavior of children in a naturalistic setting. No special instructions were provided to the children or the teachers involved in this study. Children were free to play and interact wherever and however they wished. Although teacher interactions would naturally occur in instances to encourage play or intervene to inhibit inappropriate behaviors, teachers were encouraged to keep interactions infrequent and short in duration so that children were free to play with peers if they so desired.

Data Collection. Data for this study were collected over an eight week period. Data collection procedures utilized in this study were similar to those described in sections 6B.1 and 6B.2. Each of six trained observers were responsible for observing and recording data on two subjects daily, one Down's Syndrome subject and one nonhandicapped subject. Observations were collected every weekday during the children's 30-minute free play playground period. Observations were collected using an adapted version of the Peterson Preschool Observation System for Social Interaction (1978) that included all 13 of the defined playground play areas. Using this instrument a total of 20 minutes of data were collected daily, ten minutes on each child by each observer. (A detailed description of the Peterson observation instrument and data collection procedures is described in section 6B.1.) Interobserver reliability was maintained at an 85% level of agreement or greater throughout data collection.

Results. The results of this study generally indicated that the type and extent of play and social interactions were similar among the Down's Syndrome and nonhandicapped subjects. The only significant difference that occurred between the two groups in the frequency of various forms of play was in solitary play. Down's Syndrome subjects were observed in significantly more solitary play than their nonhandicapped peers (37.48% vs. 26.24%; $p < .05$, $t = 2.72$, $df = 6$). No significant differences were noted between groups in the frequency of time spent in specific play areas. Both groups of children spent the greatest amount of time in the miscellaneous play area. Both groups of children also spent the majority of time in five play areas (miscellaneous, climbers, swings, merry-go-round, and sand box). Down's children were observed in these five areas in 89% of their total intervals and the nonhandicapped subjects were observed in these five areas in 85% of their total observations. Examination of type of play in selected play areas also indicated that some areas (e.g. merry-go-round) were much more likely to foster interactive types of play than were other play areas (e.g. miscellaneous).

The most significant differences noted between the two groups of subjects occurred in the types of playmates with whom each group interacted. Nonhandicapped subjects were observed almost four times more often to interact with another nonhandicapped child than did Down's Syndrome subjects (23.42% vs. 8.05%). In contrast, Down's Syndrome subjects were observed more than twice as often interacting with another handicapped peers than were the nonhandicapped subjects (21.23% vs. 10.06%; $t = 2.92$, $df = 6$). These differences were both significant ($p < .05$).

No significant differences were noted between groups in the type or frequency of play that occurred under specific playmates availability conditions. These conditions could include handicapped children only available, nonhandicapped children only available, or a combination of handicapped and nonhandicapped children available as playmates. For each group, solitary and parallel play were the most frequent types of play.

When the combination available condition was broken down to examine with whom interaction occurred, the trend for play with like peers again appeared. Under this condition, nonhandicapped children interacted significantly more often with other nonhandicapped children (26.65% vs. 3.61%; $df = 6$, $t = 2.53$, $p < .05$). In contrast, Down's Syndrome children were observed interacting with other handicapped children more often than were the nonhandicapped subjects (14.79% vs. 6.22%; $p < .05$, $t = 3.57$, $df = 6$).

Discussion. The results of this study indicate that the nature and extent of play and social behaviors of the Down's Syndrome and nonhandicapped children observed in this study are quite similar. The limited number of significant differences observed between these two groups of children could be due to one or a combination of factors:

1. Both groups of children are similar in the types of play and social behaviors in which they engaged.

2. There was high variability within groups of subjects on some of the variables examined.

3. There was a limited number of subjects observed within each group.

Given the limitations inherent in observational research and with the limited number of subjects, several observations can be made regarding the play and social behaviors of Down's Syndrome and nonhandicapped children:

1. Both groups of subjects showed a preference for interaction with like peers. This preference was the most pronounced for nonhandicapped children. The preference for interaction with like peers is consistent with two other studies conducted concurrently but involving different groupings of handicapped subjects.

2. Interaction between Down's Syndrome children and nonhandicapped children in this study was observed to be only 8.05%. This low rate of interaction could be attributable to the low number of nonhandicapped children available or to the possibly limited social abilities of Down's Syndrome children.

3. A comparison of the results of this study with a study by Long (1982) involving a heterogeneous grouping of handicapped children, indicates that the type and frequency of interactions of Down's Syndrome children are similar to other handicapped children. Though not a definitive finding, these results would indicate that Down's Syndrome children are no more accepted or rejected than other handicapped children.

4. This study contributes to the growing body of research on the social and play interactions of handicapped and nonhandicapped preschool children in integrated settings. The finding of this study are generally consistent with previous studies and suggests that intervention efforts are essential to promote social interactions between handicapped and nonhandicapped children.

## STUDY 8: PROCEDURES FOR FACILITATING SOCIAL INTERACTIONS
(PI's: Peterson, Heaton, & Barber)

Previous investigations of handicapped and nonhandicapped preschool children have suggested that social interaction may not be as frequent as desired between these populations under free play conditions. Reasons for these low interaction rates may be based on various factors. First, many handicapped children are functioning socially at a level below that of their nonhandicapped peers. As a result, handicapped children often lack the play skills needed to engage in various play situations with other children. Children may demonstrate delayed play skills through non-interaction with toys or the inappropriate use of play materials. Delayed social skills may also be demonstrated in children's inability to initiate and/or respond to interactions with peers. Secondly, delays in other developmental areas may inhibit peer interaction as well as appropriate play with toys. For example, delayed language development may interfere with the general communication process important to successful interaction. That is, children may not have good language skills that allow them to make requests of other children. They may not be able to communicate their wishes effectively or to exert their influence on a play activity through the verbal mediation so typically observed in young children. Delays in motor development may prohibit children from interacting with various pieces of play equipment, as well as prohibiting their engagement in many play interactions. Finally, handicapped children who exhibit inappropriate play or social behaviors, or a general lack of interactive abilities may be viewed as incapable of engaging in meaningful play experiences by their peers. These factors suggest a need for effective teaching intervention strategies that will facilitate toy and peer interactions.

Purpose. The purpose of this experiment was to develop and implement a teaching strategy that would: (a) provide handicapped children with the skills needed to appropriately interact with play equipment, and (b) facilitate interaction between handicapped and nonhandicapped children in a free play setting. The study was designed as a pilot study to examine the outcome of a teacher initiated intervention and to determine the sensitivity of the observation system to behavioral changes rendered by the intervention procedure.

Subjects/Setting. Four handicapped (two males; two females) and three nonhandicapped (one male; two females) children enrolled in the Special Education Early Intervention Preschool served as subjects for this study. The age range of the handicapped subjects was 3-9 to 6-5 years with a mean age of 4.10. Their handicapping conditions included one Down's Syndrome child (TMR level), two severely speech/language delayed children, and a mildly physically handicapped child. The nonhandicapped subjects had an age range of 3-2 to 4-5 years with a mean age of 3.11.

The study took place within an integrated preschool classroom. The classroom was designed as a special early intervention environment for handicapped children. Two thirds of the class population included handicapped youngsters with all types of disabilities ranging from mild to severe. The remaining third included normally developing children who were enrolled as "models." Throughout the study, the classroom was organized into distinctly defined play areas in the same manner as that described for earlier studies. For further detail on the organization of the preschool setting for this type of social interaction research, see Study 5A.

Phase one, the direct training of subjects, was conducted in a segregated area of the classrom as normally scheduled preschool activities were engaged in by the remaining classroom population. The second phase took place within the context of a daily free play activity in which all class members participated. The total population of the preschool at the time of this study was 18 children -- 13 handicapped and 5 nonhandicapped.

Experimental Procedures. The design of this study consisted of baseline and systematic intervention within two play areas -- P.E. (physical education) and kitchen. The intervention occurred in one play area at a time. However data collection was continued on all play areas normally found in the free play setting in order to provide a comparison with play areas where intervention occurred. The first half of the intervention utilized play equipment normally found in a P.E. area (plastic hoops, punching bag, scooter board, tubmobile, roll-a-sphere), and the second half used toys and activities associated with a kitchen play area (dishes, cooking utensils, dress-up clothes, dolls, cleaning props, play food). Toys were selected that would allow for cooperative play between children.

Phase one of the study consisted of the direct training of two behaviors: (a) the selection of peers for play interaction, and (b) appropriate play with peers on teacher-selected toys. The training strategy consisted of teaching all subjects one appropriate method of play with a selected toy and the process of selecting and engaging in play with a peer. These behaviors were trained on a new toy every five days. During each five-day cycle, the teacher would demonstrate how to play on or with the equipment and allow children to practice. The trainer would then demonstrate how to choose a partner ("pick a buddy") to play with them and would select partners for each child to invite (forced-choice). The final step consisted of children selecting their own partners (free-choice) to play on the equipment. Phase two consisted of generalizing the trained behaviors to the daily free play setting. On selected days, the toys and play equipment used during the training sessions were placed in the free-play setting and "Buddy Day" was announced as a reminder. Social reinforcement was used by the teacher to reward the generalization of any of the trained behaviors by the seven subjects.

Data Collection. Observational data were collected in three phases: (a) during the baseline condition which occurred for approximately 10 weeks prior to the beginning of training, (b) during intervention - phase 1 condition when intervention focused upon play in the P.E. area (approximately 8 weeks) and (c) during intervention-phase 2 when intervention focused upon play in the kitchen area (approximately 8 weeks). Procedures for collecting data involved daily observation of the targeted subjects during their 30 minute free play and interact with handicapped and nonhandicapped peers and to play in areas and with toys on which they had been trained. Observations were made using time sampling methods with 30 second intervals. The Peterson Preschool Observation System for Social Interaction (1978), described in earlier studies, was used to aid the accompanying procedures for data collection. (See Study 5A for detail. The same procedure outlined there was applied in this study.)

Two behaviors were recorded during each training session: (a) selection of peers, and (b) appropriateness of play interaction. Selection of peers consisted of the name of the initiating child and the peer they selected to play with them. Appropriate peer interaction, defined as cooperative play on or with a toy, was recorded (+). Inappropriate play (-) consisted of isolation, parallel play, no play or the continuance of off-task behaviors. Teacher prompts (p) were recorded whenever teacher intervention was needed to promote interaction, or assist a child with the play material.

Results. Results of this study are very tentative and can be treated only as preliminary information on possible intervention procedures and methods for monitoring social change among handicapped and nonhandicapped classmates as a result of training. Data were summarized both as group data and individual graphs were prepared on subjects across baseline and intervention phases. Those results are briefly summarized only in narrative form here since they are viewed as preparatory to further research on intervention strategies. The very small number of subjects included in this study and excessive absenteeism and subject loss also introduced further complications for this study. Results are thus tentative and should be replicated with other subjects. Results may be described generally as follows:

1. Type of play interaction exhibited by subjects in various play areas across baseline and intervention conditions.

   Social behavior and play were monitored in all play areas in order to compare child behaviors in areas where intervention did occur with those play areas in which intervention did not occur. As described earlier, intervention training focused upon the P.E. area during phase 1 and the Kitchen area during phase 2. Data of the occurrency of no play/solitary play/parallel play/cooperative play of H and NH subjects shows that handicapped children increased in nonisolate play (parallel and cooperative play) in four of the six play areas during intervention. Nonhandicapped subjects showed the most increase in nonisolate play in the kitchen area (23% to 52%) during the intervention training with the greatest change occurring in the amount of parallel play being manifest. These data suggest that possibly the intervention training in the kitchen area did produce some increases in prosocial behavior. In summary, the total nonisolate average across all play areas increased from 34.44% to 44% for handicapped subjects during intervention and from 43% to 52% for NH subjects. The average parallel play for handicapped children increased from 31% to 41% and both parallel and cooperative play fr NH subjects showed similar increases (40% to 46%, and 3% to 7%).

2. Proportions of play/no play behavior by handicapped and nonhandicapped subjects across baseline and intervention conditions.

   One of the purposes of the intervention training was to teach children how to play with toys and play equipment. This, of course, is one of the frequently observed problems with handicapped children that thwarts their participation in group activities -- i.e. they do not know how to play nor do they have social skills that allow them to be approached by other children or to approach them. Hence as shown in data reported earlier, their rates of no play tend to be high. One objective of training, therefore, was to decrease the rate of no play and increase constructive play activity. Data from the baseine and intervention phases, however, showed no major change in this variable in overall play across individual or all play areas. Handicapped children showed a small decrease from 16% to 13% of no play. Nonhandicapped subjects showed approximately the same level of change.

3. Playmate types with whom handicapped and nonhandicapped subjects associated in various play areas across baseline and intervention conditions.

Data were summarized in regard to the amount of time H and NH subjects spent with handicapped playmates only, nonhandicapped playmates only, and combination playmates. The general averages of these interactions across all areas showed little change across baseline and intervention conditions except for a slight decrease in the selection of "No One" for both handicapped and nonhandicapped subjects. There was a slight increase in interactions between both handicapped and nonhandicapped children with a like peer.

As for interaction patterns in the areas in which specific intervention occurred, handicapped children tended to show a rather interesting pattern across the two phases of intervention training. During phase 1, interactions decreased briefly with both peer types, but then accelerated during phase 2. During phase 2 (intervention in the kitchen area) the most meaningful increase occurred in the interactions of handicapped children with nonhandicapped peers (from 10% during baseline to 20% in phase 2). During intervention in the P.E. area, handicapped youngsters increased their interactions with other handicapped children, but then decreased them again when intervention moved to the kitchen area.

In conclusion, general increases (although small) were noted in both populations of subjects in the kitchen and P.E. areas during intervention, although the greatest changes were apparent during the second phase of training in the kitchen area. However, it was apparent that changes were rapidly lost when training in one area was changed to another area. That is, increases generated in one area diminished in that same area once training focused upon play in another area.

4. Play areas where handicapped and nonhandicapped subjects spent their time across baseline conditions.

The mere emphasis upon play in the two intervention areas would seem to increase the probability that children would spend more time in those areas. Data were examined to see if this did indeed occur. Both handicapped and nonhandicapped subjects showed an increase in time spent in the kitchen area during phase two (kitchen intervention). During phase 1, P.E. intervention, the nonhandicapped children showed a slight increase in play for that area, but the handicapped did not. This increase for nonhandicapped subjects dropped back to baseline level, however, after the P.E. intervention was terminated.

5. Overall types of nonisolate play behavior with peers exhibited by H and NH subjects over baseline and intervention conditons.

From baseline to phase 2, handicapped children showed a significant increase in parallel play interaction with other handicapped peers (17% to 38%) and a decrease in parallel play with nonhandicapped peers and combinations of handicapped and nonhandicapped peers. Isolate play among handicapped subjects also dropped from 63% to 50% across conditions. Nonhandicapped children showed an insignificant increase in cooperative play with handicapped peers (0 to 4%) and a greater increase in parallel play with other nonhandicapped children (14% to 22%). A decrease for this population in isolate play was also noted (47% to 35%). In general, the nonisolate play of handicapped subjects increased from 37% to 47% between baseline and phase 2. A smaller increase was noted for nonhandicapped subjects (51% to 59%). In summary, a decrease of isolate play and an increase of nonisolate play was noted for all subjects.

In conclusion, further research is needed to examine intervention strategies. Based upon this study, it would appear that several approaches would be advantageous: (a) data collection should be more tightly focused on the specific behaviors being trained if the direct effects of training are to be assessed, (b) more systematic manipulation/training variables are needed to control for intervening variables, and (c) monitoring of training generalization to conditions other than those trained would be important in assessing intervention outcomes.

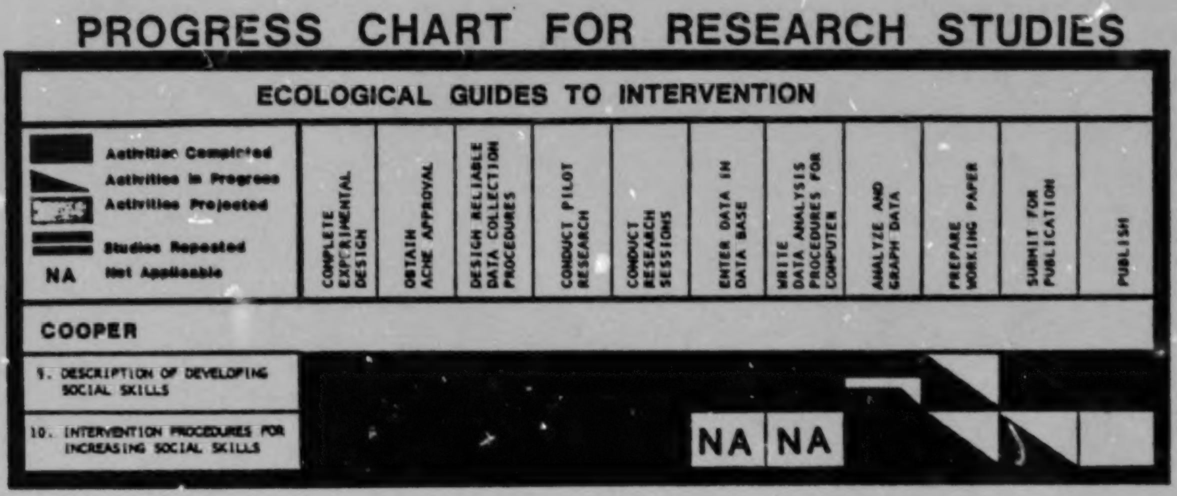

PROGRESS CHART FOR RESEARCH STUDIES
ECOLOGICAL GUIDES TO INTERVENTION
Activities Completed
Activities in Progress
Activities Projected
Studies Repeated
NA Not Applicable
COMPLETE EXPERIMENTAL DESIGN
OBTAIN ACHE APPROVAL
DESIGN RELIABLE DATA COLLECTION PROCEDURES
CONDUCT PILOT RESEARCH
CONDUCT RESEARCH SESSIONS
ENTER DATA IN DATA BASE
WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER
ANALYZE AND GRAPH DATA
PREPARE WORKING PAPER
SUBMIT FOR PUBLICATION
PUBLISH
COOPER
9. DESCRIPTION OF DEVELOPING SOCIAL SKILLS
10. INTERVENTION PROCEDURES FOR INCREASING SOCIAL SKILLS
NA
NA

FIGURE 19

## ECOLOGICAL GUIDES TO INTERVENTION

### QUESTION D: HOW DO SOCIAL SKILLS DEVELOP IN HANDICAPPED CHILDREN?
(Investigator: Cooper)

To be a "cooperative person" is considered a desirable trait for both children and adults. For the young child, the ability to play cooperatively with peers results in an easier adjustment to social and academic school experiences.

One of the most commonly stated reasons for providing a child with preschool experience is to promote the child's acquisition of social skills. These skills include the ability to interact verbally and nonverbally with peers, to share materials, and to cooperate on activities.

Between the ages of two and five years, normal children's social interaction with peers has been observed to increase both qualitatively and quantitatively. Some authors note general stages of social development at fairly specific ages. Gesell's and Ilg's (Todd & Hefferman, 1964) social development chart proposes that at age two the child hoards and does not share; at age three the child plays in parallel; the four-year-old displays some cooperative play; and at age five, positive social interaction increases. Smart and Smart (1967) described social play as a progression from simple to complex, from solitary play to cooperative play. In general, developmental sequences of play for normal children appear to be fairly consistently defined. However, it is not known if the same sequences of development describe the developmentally delayed or handicapped child.

It is important for teachers of normal, handicapped, and at-risk children to know how children of various ages and abilities might be expected to interact with one another. Such information helps teachers ascertain whether or not a child is outside the developmental norms for play behaviors. Particular emphasis on cooperative or positive social interaction skills in such norms would provide teachers some guidance about what play behaviors to expect or to try to develop with all children. Normative data could also indicate whether play behaviors change simply as a function of age for most children and whether these changes proceed through the stages typically described as developmental patterns (for example, from the more simplistic or solitary play through parallel play to more complex or cooperative play).

If limited children are found not to play cooperatively with other children in accordance with expectations derived from their normal peers' behavior, then procedures must be found to increase their development in this area. In fact, if any child is found to be lacking in cooperative skills, more information should be available to those working with the child in terms of what procedures might be effective for increasing them.

## STUDY 9: THE DESCRIPTION OF DEVELOPING SOCIAL SKILLS IN NORMAL, AT-RISK, AND HANDICAPPED CHILDREN

(PI: Cooper)

Purpose. The main thrust of the research in this classroom is twofold: to examine and describe how social skills develop in handicapped and nonhandicapped children and to find intervention techniques which will increase the social skills of these young children.

One of the most commonly stated reasons for providing a child with preschool experience is to promote the child's acquisition of social skills. These skills include the ability to interact verbally and nonverbally with peers, to share materials, and to cooperate on activities. They are highly regarded as pre-entry or readiness skills by most kindergarten teachers.

The purpose of this research was to collect longitudinal data on the social interaction skills of normal and handicapped preschoolers and, based on these data, to formulate and test intervention strategies for facilitating the development of additional appropriate skills.

Data which have been systematically recorded and analyzed are limited in the area of development of play behaviors among normal preschool aged children and nearly nonexistent for handicapped children. More information is needed on at-risk/handicapped children to determine how the patterns of social development are similar and/or dissimilar to those of normal children.

Subjects. Data on about twenty-one subjects have been or will be entered for computer analysis. These include children of different ages (from 2½ to age 5) and sex and includes handicapped and nonhandicapped children. Thirteen to fifteen preschoolers were in this class; from 40% to 60% of these children had one or more limitations which ranged from at-risk to severe. These children represented diverse handicapping conditions which included specific physical disabilities (e.g. large and small motor skills, social, language, conceptual); or some dimension of development which suggested they were likely candidates for further developmental difficulties (at-risk). The other children were considered "normal". For some children, the observations spanned a 2 to 2½ year period for a total of 100 or more sessions, for others, only a semester (about 20 sessions).

Setting. The setting was an integrated preschool classroom in the Edna A. Hill Child Development Laboratory at the University of Kansas supervised by Alita Cooper. The class was in session daily for two and one half hours for four days a week. There were typically three or four teachers in the room, two graduate students and two undergraduate students in the early childhood program training sequence.

Data Collection/Procedures. A basic social interaction code was written by Cooper in 1971. This observation code has proved useful as a diagnostic tool for identifying children who are at-risk or seriously deficit in social skills and who might benefit from specific intervention procedures to increase the amount or quality of their interactions. The code can be used for observation of children considered either nonhandicapped or handicapped, and modification of the basic code to adjust to the needs of an individual child are easily made and reliability obtained.

Data are collected by trained observers using a 10-second time sampling system to record the play behaviors (cooperative, parallel, or solitary play) of the subject, teacher attention to the target child, and time the child is unoccupied. Typically, 100 intervals of data are collected on each subject during an hour-long free choice period, when the children may choose from the available activities and interactions are more apt to occur.

Results. A system for organizing, entering, and analyzing the extensive longitudinal and cross-sectional data collected during the course of this project and in previous years has been developed. Considerable time has been invested in training observers, programmers and data entry personnel. Data has been entered on twenty-one subjects. The results will not be available for some months; consequently no complete analysis has been done on the many questions that are to be asked.

Discussion/Significant Findings. The longitudinal data collected in this study will form the basis for recommendations to educators about the development of social skills in handicapped and nonhandicapped children. This study is intended to provide descriptive data on social skills for children of different ages and handicapping conditions. It is hoped that these date will provide some answers to these questions:

1. Do handicapped children develop social skills "on their own" just as well as normal children?
2. Does the type and/or severity of a handicapped condition make a difference? (Health impaired, physical defect, behavior problem, developmentally delayed)
3. How do age and handicap interact to effect the development of social skills?
4. Are there any sex differences?

These descriptive data will be used to develop more specific norms of play behaviors. They will, in addition, provide information regarding the kind and amount of teacher attention given to normal, handicapped and at-risk children. Correlational and multivariate analysis will be used to determine the effects of age, handicapping conditions, child grouping, teacher support and other environmental conditions on acquisition and display of cooperative play skills -- or on "good social skills."

Recommendations for Further Research and Development. Support from the Institute has allowed the extensive collection of play behavior data and data on intervention procedures in the social area. This support has also been essential in the development of the computer analysis work which makes it possible to analyze and ultimately use these data.

Data from both the longitudinal and experimental studies will be used to develop the parameters of norms for play behaviors. This information is very scarce in the literature presently, but it is clearly needed by teachers.

The data from this work can now be translated into practical methods and procedures for teachers to use in the classroom, as mainstreaming becomes more common at the preschool level and as more states mandate the provision of educational opportunities for young handicapped children.

This data base is not only practical, but serves as a foundation for questions to be asked in future research as well.

Other research I am interested in implementing in the next years include:

1. Play data recorded on 15-20 month old nonhandicapped, at-risk and handicapped children.
2. Record data on children in more diverse settings such as day care. It is often stated these children are "more social" than children in part day programs. Again, data would be needed on nonhandicapped and those considered at-risk to severely handicapped in the physical and social areas.
3. I would like to look at the same data in a home day care setting.

## STUDY 10a: INTERVENTION PROCEDURES FOR INCREASING SOCIAL SKILLS: THE USE OF BRIEF CHAIR TIME OUT TO DECREASE THE AGGRESSIVE BEHAVIOR OF TWO PRESCHOOL BOYS

(PIs: Thomas, Whitehead, Cooper, Etzel & LeBlanc)

Purpose. Two studies were conducted to assess the effects of a brief chair time out procedure on two preschoolers' physical aggression. These children also exhibited aggressive behavior toward adults, peers, and materials; the other children and teachers, as well, began to avoid interaction with them. This investigation, which used time out as a treatment procedure, was implemented to reduce their physical aggression to a more acceptable level as quickly as possible.

Subjects/Setting. Subject 1 was a 5 year, 1 month old male, new to this classroom. He had many physical problems and was under treatment for seizures.

Subject 2 was a 5 year, 6 month old male who had attended the preschool the previous year. He was described by his parents as hyperactive. During his time at preschool, the quality of his preacademic time (doing assigned tasks) had improved greatly, and his attention span had lengthened. The amount of aggression during free choice time was a new behavior for this school year.

Both subjects were observed to participate in positive social interactions, but a high rate of aggressive behavior was also observed.

The setting was Cooper's integrated classroom in the Edna A. Hill Child Development Laboratory, the free choice time of day.

Data Collection. The same observational code was used to measure the behavior of both children. Both children were observed simultaneously for 100 ten-second intervals (16 minutes, 40 seconds) during the latter part of free choice time and the beginning of clean up period. The subjects' verbal, physical and materials aggression were recorded, as well as time out frequency and duration; teacher praise, verbal reprimands, and physical intervention were also recorded.

Experimental Design/Procedures/Results. Physical aggression toward peers and adults resulted in time out. Verbal aggression and misuse of materials was not treated. Conditions of the studies were as follows: (A) Baseline; (B) Subject 1 in time out for physical aggression; (C) Subject 2 in time out for physical aggression; (D) both subjects in time out for physical aggression. Reporting of the data will be separate for each subject, yet the collateral effects of treatment applied to each subject will be discussed.

## Study 1

Subject 1. Baseline data were collected on Subject 1's aggressive behavior, showing a mean of 6.4% of the intervals observed (A). Due to this high rate, Subject 1 was placed in time out (B); physical aggression dropped quickly to a mean of 1.6% during this condition. Time out was then used with Subject 2, while Subject 1 was no longer placed in time out for physical aggression (C); Subject 1's physical aggression rose sharply to a mean of 7.8%. Next, time out was used for both subjects (D); physical aggression for Subject 1 dropped quickly to a mean of 2.3%. The next condition was a return to baseline in which neither subject was systematically placed in time out (A); Subject 1's physical aggression rose dramatically to a mean of 10.8%. Due to this high rate, the time out procedure was re-instated for Subject 1 (B) resulting in a decrease in physical aggression to a mean of 2.8%. In the final condition (D), Subject 1 remained in time out and Subject 2 was again placed in time out. A further decrease in physical aggression, to an average of 2.5%, was observed for Subject 1.

## Study 2

Subject 2. Systematic observation of the free play behavior of Subject 2 yielded baseline means of 6.7% for physical aggression (A). Following use of the time out procedure with Subject 1 (B), Subject 2's physical aggression decreased to a mean rate of 5.8%. Additional and more significant decreases in physical aggression resulted when the time out procedure was consistently implemented for Subject 2 (C). During this condition, the mean rate of physical aggression for Subject 2 was 1.8%. When both subjects were placed in time out (D), Subject 2's physical aggression remained at a low .3%. In a subsequent reversal to baseline conditions (A), the mean rate of physical aggression for Subject 2 rose to 10.7%. Placing Subject 1 into a time out condition once again (B) lowered Subject 2's rate of physical aggression to a mean of 4.2%. During the final condition (D), the mean rate of physical aggression by Subject 2 was 1.1%.

Discussion. The time out procedure was effective in decreasing the rate of physical aggression for both subjects. Using the time out procedure with Subject 1 not only reduced his physically aggressive behavior but also reduced the rate of Subject 2's physical aggression. Reciprocal effects were not obtained, however; placing Subject 2 in time out for physical aggression had no effect on the rate of Subject 1's physical aggression. This was not the case, however, when the time out procedure was used with Subject 2 only (i.e., the rate of Subject 1's physical aggression did not remain low). These findings suggest that for some children, observing another child in time out is sufficient for reducing aggression. For others, brief chair time out may be the quickest and most effective way to reduce aggression and, therefore, may be the best for teacher and child.

## STUDY 10b: INTERVENTION PROCEDURES FOR INCREASING SOCIAL SKILLS: MANIPULATION OF PEER BEHAVIOR AND TEACHER ATTENTION AS AN ANTECEDENT STIMULUS TO INCREASE THE SOCIAL INTERACTION OF AN ISOLATE CHILD

(PIs: Fallows, Cooper, Ruggles, and LeBlanc)

With the emphasis now on mainstreaming handicapped children into nonhandicapped classrooms, there comes a greater need to pursue feasible and effective measures for fostering appropriate social behaviors in the behaviorally disordered child.

Investigations concerning the effect of teacher attention on social behavior are prevalent in the literature. The term "teacher attention", however, has typically included a wide variety of teacher behaviors such as verbal and physical praise; offering materials; making suggestions; and teacher proximity to child (Hart, Reynolds, Baer, Brawley, & Harris, 1968; Allen et al., 1964).

In an attempt to further examine issues concerning the effects of the antecedent component of teacher attention (Miller, 1971), and the use of peers as agents to increase the social behavior of isolate children (Strain, Shores, & Timm, 1977; Strain, 1977), the following investigation was undertaken.

Purpose. The purposes of this investigation were: 1) to examine the effects of increasing direct and indirect primes to social interaction in a research room setting on the subject's social interaction in the research room and in the classroom; and 2) to examine the feasibility of using peers as aides to increase a preschool child's social behavior in research room training sessions; and 3) to examine the effects of this (latter) procedure on subsequent peer interaction in the classroom.

Subject. The subject of this study was a 4.6 year old male who had been enrolled in Cooper's part-day preschool for four months when this investigation began. Referral had been made by the parents, who had expressed concern about their son's delay in development of social skills. The subject also attended occupational therapy sessions twice a week and speech therapy sessions four times a week. Parents had taken the subject for neurological evaluative testing, but no conclusive results were reported.

The subject exhibited atypical social behaviors in the classroom and at home, such as wandering around the classroom without becoming involved in any activity and exhibiting self-stimulatory behaviors (i.e., waving hands and jumping up and down), in front of mirrors and windows. Frequently, the subject exhibited disruptive behaviors which resulted in his receiving attention from both peers and teachers. Because of the subject's sudden and sporadic episodes of aggression toward peers, the children in the classroom rarely interacted with him. The subject's language was characterized by much echolalic speech; few spontaneous verbal skills were exhibited beyond his correct use of other children's names. Because of the subject's low rate of social interaction and parental concern, the following investigation was undertaken.

Setting. The first phase of this experiment took place in the classroom during the second half of the one-hour, free-play period. A separate activity was set up in each of three major areas of the room, and a teacher was assigned to monitor that activity. Children were encouraged to sample all activities and could interact freely with any peers in the classroom.

The second phase involved special training sessions using a peer confederate. These sessions took place in a research room outside of the classroom during the first half of the one-hour, free-play period. One of the regular classroom teachers took the subject and a predetermined, high social, confederate peer to a research room where a cooperative activity was set up. The two children were told they were going to play together for awhile and then return to the classroom. After the special sessions, the activity set-up in the research room was moved to the classroom; the subject and confederate peer returned to the classroom and could interact with any materials or peers they chose. To assess the generalization of the effects of the research room training sessions, the subject's behavior was observed in the classroom immediately following these sessions.

Data Collection. Data were recorded in the classroom four days a week and in the research room two to four days a week by a trained observer using a clipboard, stopwatch and recording sheet. A continuous 10" interval recording system was employed.

The subject's manipulation of materials, participation in cooperative play and compliance to teacher primes were recorded. Both verbal and nonverbal social interaction between the subject and peers were observed.

The teacher behaviors recorded were: activity primes, direct and indirect social interaction primes, and praise for positive interaction with peers and/or materials.

Experimental Design/Procedures. A reversal design in which treatment in classroom and/or research room alternated with baseline conditions in the classroom (A, B, A, C/A, A, C/A, C/B, A, C/B) was implemented in this experiment.

Teacher behavior, peer behavior and setting varied in each condition as follows:

Baseline I: The subject was observed in the classroom during the free-play period. Teachers were naive as to behaviors being observed and experimental condition being imposed.

Increased social interaction primes in the classroom: In an attempt to pursue a pragmatic approach to the problem, a classroom intervention procedure was implemented initially: All classroom teachers were instructed to give social interaction primes and reinforcement to the subject as specified in the above discussion of classroom intervention. Classroom arrangement was identical to that of Baseline I, with varying activities daily. Observations were made in the classroom only.

Training sessions/Baseline in classroom: On Mondays and Wednesdays the subject, a confederate peer, and a teacher took part in training sessions as described in the intervention procedures. Baseline conditions were in effect in the classroom. Data were collected in the classroom four days a week. The play activity used during training sessions on Monday was available during classroom observations on Monday and Tuesday, and the play activity used during Wednesday's training session was available in the classroom during Wednesday's and Thursday's observation.

Baseline III: Training sessions were omitted and observations in baseline conditions were continued in the classroom.

Training sessions/Baseline in classroom: In this condition, the training session intervention procedures were replicated, and observations in the classroom, under baseline conditions, immediately followed those sessions. Training sessions occurred on Mondays and Wednesdays and baseline classroom observations took place daily. Activities used during training were once again present in the classroom on the same day as training and the following day.

Training sessions/Increased social interaction primes in the classroom: Special training sessions were implemented on a daily basis rather than on alternating days as in the previous condition. Immediately following these sessions classroom intervention procedures were reinstated and data were recorded in the classroom. Once again activities were constant across settings.

Baseline IV: Observations were conducted in the classroom only under conditions similar to previous baseline conditions.

Training sessions/Increased social interaction primes in the classroom: Conditions were identical to previous condition in which both classroom intervention and training sessions were implemented daily.

Reliability. Overall occurrence reliability for teacher behaviors in the classroom ranged from 0% to 100%, with an average of 70%; for teacher behaviors in the research room, reliability ranged from 0% to 100%, with an average of 75%. Overall occurrence reliability on subject behaviors in the classroom ranged from 0% to 100%, with an average of 66%; for subject behaviors in the research room, reliability ranged from 0% to 100%, with an average of 63%. Chance reliability levels were consistently below 10%.

Overall occurrence plus non-occurrence reliability for teacher behaviors in the classroom ranged from 92% to 100%, with an average of 98%; reliability for teacher behaviors in the research room ranged from 92% to 100%, with an average of 95%. Overall reliability on subject behaviors in the classroom ranged from 88% to 100% with an average of 96%; reliability in the research room for subject behaviors ranged from 78% to 100%, with an average of 94%.

Results. Data reflecting the subject's social interaction appear in Figures 20 & 21. Baseline conditions were consistently accompanied by a lower rate of completed social interactions than treatment conditions. During Baseline I, the subject was involved in social interaction for an average of 3% of the observation intervals. When social interaction primes were manipulated in the classroom (Increased Primes, Classroom), social interaction rose slightly to a mean of 4% of the intervals.

When these primes were removed and baseline condition reinstated (Baseline II), the subject's rate of social interaction fell to a mean of 1% of the intervals. In the first condition in which social primes were increased in the research room (Increased Primes, Research Room), social interaction in the research room occurred during an average of 25% of the intervals. Continual monitoring of classroom behavior indicated that this procedure was also having effects in the classroom setting. Classroom social behavior increased gradually over the condition from 0% to 26%, with an overall mean of 10%.

Removal of this procedure during the return to baseline conditions (Baseline III), resulted in an immediate decrease in social interaction in the classroom. When research room intervention procedures were reinstated (Increased Primes, Research Room), the subject interacted during an average of 29% of the intervals in the research room and a mean of 12% of the intervals in the classroom. Although the overall mean rate of social behavior in the classroom increased somewhat during this condition, this change was variable. Therefore, in the next condition, social primes were increased in the classroom concurrent with the increase of social primes in the research room. Results indicated a stable increase in classroom behavior. The mean rate of social interaction for this condition (Increased Primes, Research Room and Classroom), was 25% during research room sessions and 15% during treatment in the classroom.

Removal of this procedure in both the classroom and the research room (Baseline IV), resulted in a marked decrease in social interaction in the classroom. When the combined treatment package was reinstated

A. SUBJECT INITIATIONS TO PEER

B. PEER INITIATIONS TO SUBJECT

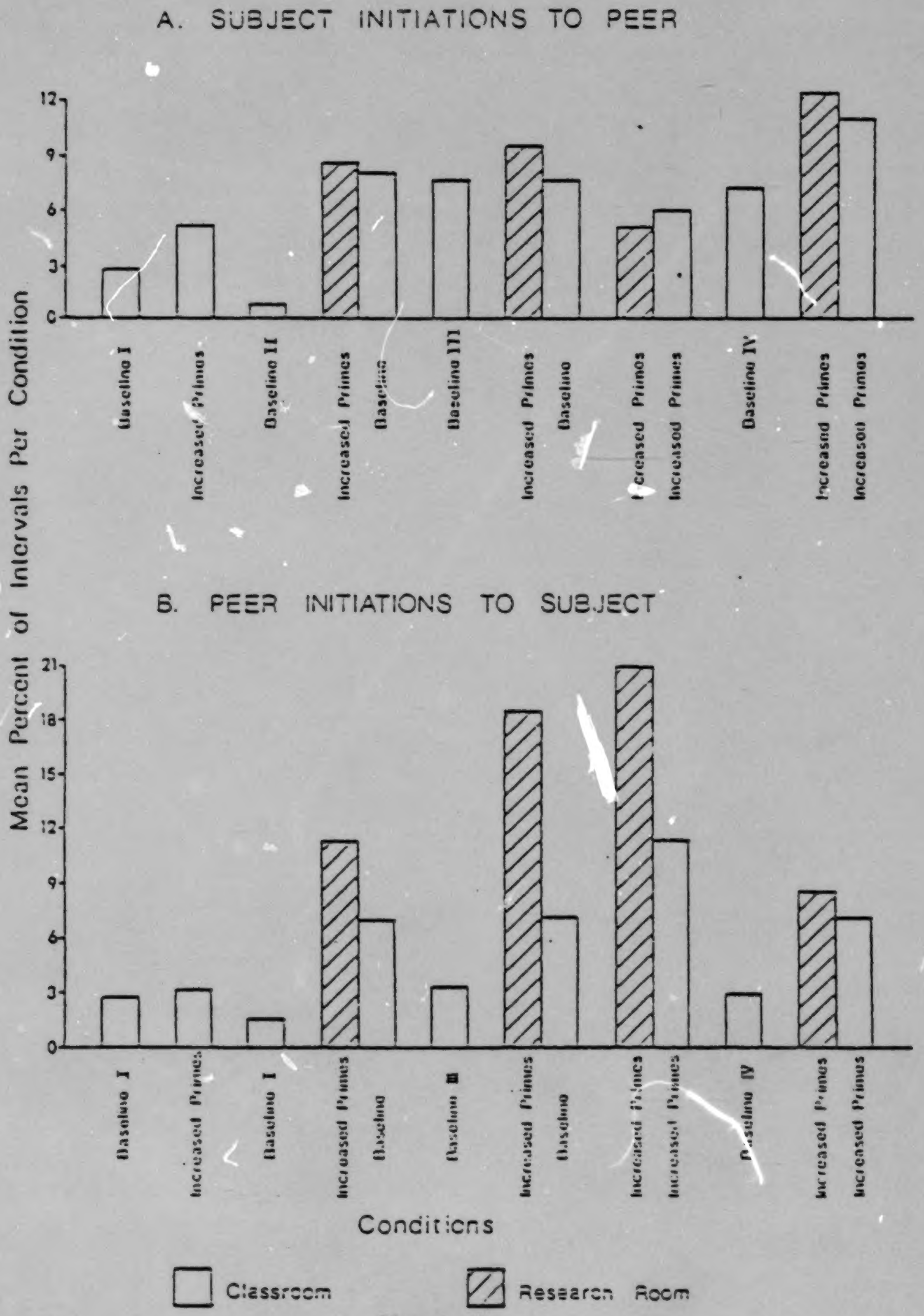


Figure 20

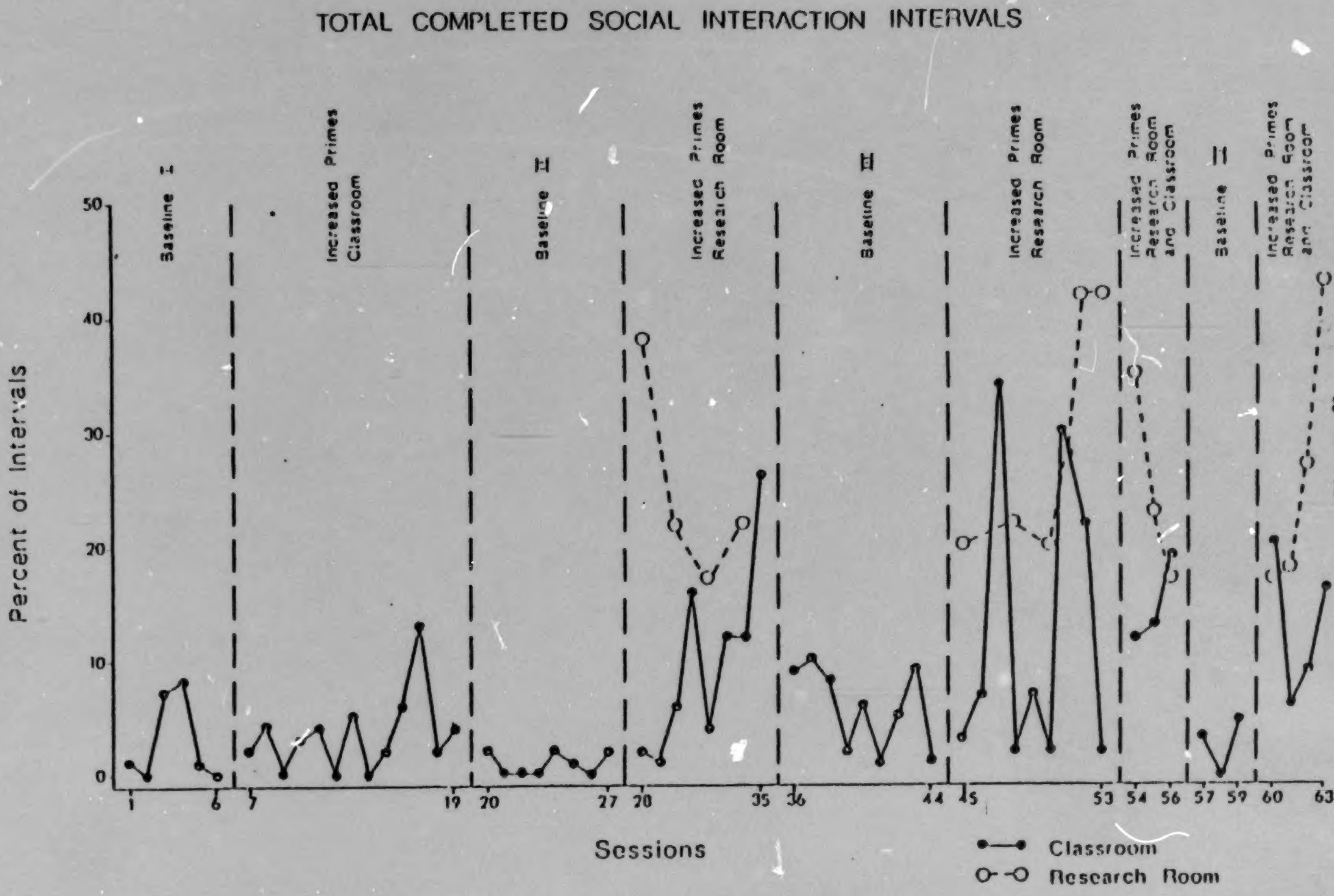

TOTAL COMPLETED SOCIAL INTERACTION INTERVALS
Percent of Intervals
50
40
30
20
10
0
Baseline I
Increased Primes Classroom
Baseline II
Increased Primes Research Room
Baseline III
Increased Primes Research Room
Increased Primes Research Room and Classroom
Baseline II
Increased Primes Research Room and Classroom
1
6
7
19
20
27
28
35
36
44
45
53
54
56
57
59
60
63
Sessions
Classroom
Research Room

Figure 21

(Increased Primes, Research Room and Classroom), the subject's social behavior once again increased to a mean of 26% in the research room and 13% in the classroom.

Further examination of the subject's verbal and nonverbal behavior indicated that subject initiations to peers increased from a mean of less than 3% of the intervals during the (Baseline I) condition to a mean of 11% in the final treatment condition (Increased Primes, Research Room and Classroom).

Discussion. Results indicate that social primes in the research room alone increased the rate of subject social interaction in the classroom and that combined classroom and research room treatment produced a larger increase in social interaction in the classroom. It is suggested that manipulation of social primes directed to the peer and the target subject can be effective in increasing the social interaction of an isolate child.

### STUDY 10c: TEACHER-IMPLEMENTED OPTIMAL TEACHING ASSESSMENT STRATEGIES FOR MODIFYING NONCOMPLIANCE TO INSTRUCTIONS DURING PREACADEMIC LEARNING

(PIs: LeBlanc, Etzel, Goldstein, Cooper, Drake, Hass, and Ruggles)

This study is reported in Assessment Guides to Intervention, Question B, Study 12.

### STUDY 10d: INTERVENTION PROCEDURES TO INCREASE SOCIAL SKILLS: THE USE OF TEACHER ATTENTION WITH PRIMES AND A SPECIAL ACTIVITY TO INCREASE COOPERATIVE PLAY IN TWO PRESCHOOLERS

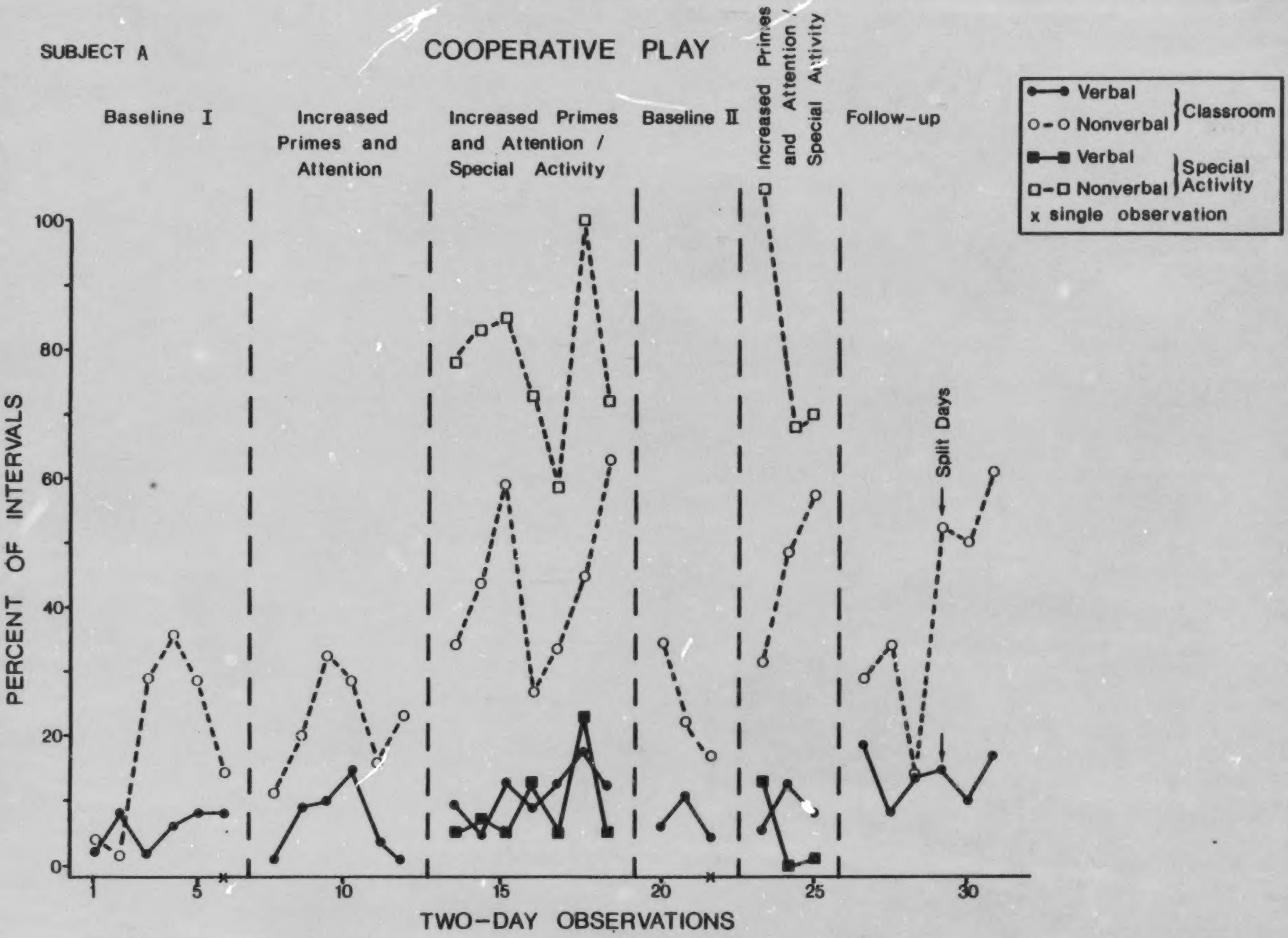
(PIs: Whitehead, Cooper, Ruggles, Etzel, and LeBlanc)

Purpose. The purpose of this study was to investigate the effects of two treatment procedures: (1) increased primes and teacher attention to cooperative play, and (2) increased primes and teacher attention with a special activity training session on the nonverbal and verbal cooperative play of two preschool children with quite deficient social interaction skills.

This investigation combined procedures found effective in the development of cooperative play in young children. These techniques were developed to allow for minimal teacher time, require no special experimental rooms or equipment, and take place directly in the preschool classroom to maximize the potential for generalization and maintenance of the newly-acquired social skills.

Subjects/Setting. The two subjects who participated in the study were enrolled at the Edna A. Hill Child Development Laboratory Preschool at the University of Kansas, in Cooper's classroom with normal and

Figure 22


SUBJECT A
COOPERATIVE PLAY
Baseline I
Increased Primes and Attention
Increased Primes and Attention / Special Activity
Baseline II
Increased Primes and Attention / Special Activity
Follow-up
Verbal
Nonverbal
Classroom
Verbal
Nonverbal
Special Activity
x single observation
Split Days
PERCENT OF INTERVALS
0
20
40
60
80
100
1
5
10
15
20
25
30
TWO-DAY OBSERVATIONS

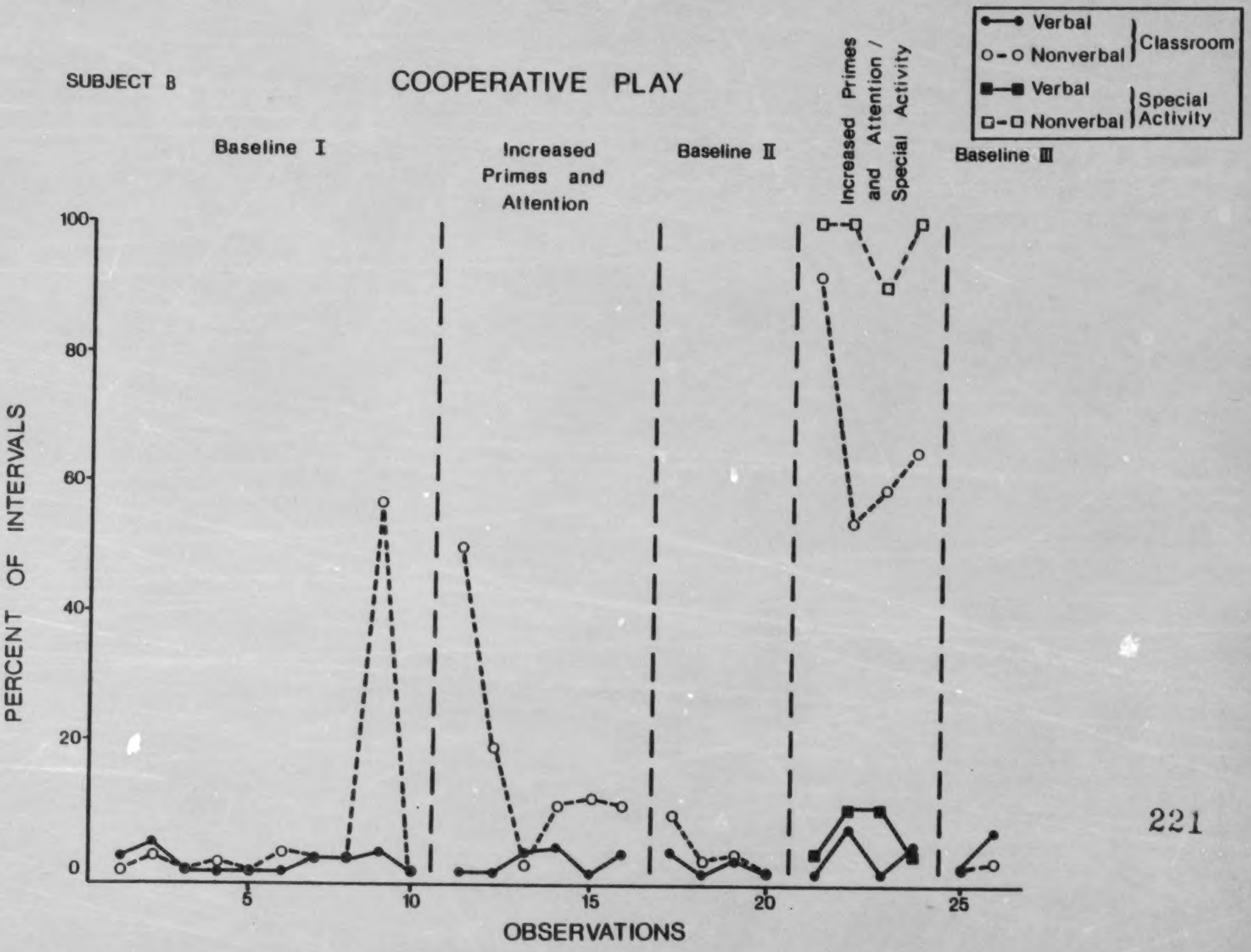

SUBJECT B
COOPERATIVE PLAY
Verbal
Nonverbal
Classroom
Verbal
Nonverbal
Special Activity
Baseline I
Increased Primes and Attention
Baseline II
Increased Primes and Attention / Special Activity
Baseline III
PERCENT OF INTERVALS
100
80
60
40
20
0
5
10
15
20
25
OBSERVATIONS

Figure 23

developmentally delayed children. Subject A was enrolled one year prior to Subject B, who attended the summer semester only. Subject A was a 4 year, 2 month old male with speech and language delays. Subject B was a nonhandicapped male 4 years of age.

Data Collection. Data were recorded in the classroom four days a week for 100 intervals each day (16 minutes 40 seconds). A 10-second interval system of recording was used.

Design/Procedures. Experiment 1: Subject A was observed for nonverbal and verbal cooperative play during the free choice play period. Baseline data were also recorded on subject, teacher, and peer verbal initiation behaviors. Classroom teachers were then instructed to increase direct primes and attention to cooperative play. Because there was no change in nonverbal or verbal cooperation levels, the following treatment condition added a special activity training session which took place in an area partitioned off during the beginning of the free choice play period. The subject and one peer were brought to the area and invited to play using materials or equipment which were considered conductive to cooperation. This activity, which was five minutes in length, took place prior to the collection of the classroom data. After the training session, the partitions were removed and the materials were then available to all the children for the remainder of free play. Following a return to baseline, the special activity condition was reimplemented. After a one-month semester break, follow-up data were recorded, with conditions similar to those of previous baselines. (See Figure 22.)

Experiment II: The second experiment was initiated upon Subject B's enrollment in the preschool during the same semester as follow-up data were being recorded on Subject A. Experiment II replicated the treatment procedures of Experiment I. The initial baseline was followed by increased primes and teacher attention. After a return to baseline, the special activity condition was implemented. A brief reversal (Baseline III) followed. (See Figure 23.)

Results. Cooperative play was low for both subjects during the baseline and reversal conditions. During increased primes and teacher attention, both subjects showed only a slight increase in nonverbal and verbal cooperation. When the special activity condition was implemented, high rates of nonverbal cooperation were observed. The addition of this special activity training session showed dramatic increases for both subjects in nonverbal cooperative play, with little change shown in verbal interaction. Maintenance of the high level of nonverbal cooperation was observed for Subject A during the one-month follow-up.

Discussion. The low rate of cooperative play during baseline and the teacher attention and primes conditions suggest that the "package" of a special activity training session combined with teacher attention and primes to cooperative play was necessary to increase both subjects' nonverbal cooperation. It is hoped that such a procedure, which is both effective and easy to implement, may provide an opportunity for classroom teachers to remediate such an important aspect of a child's social development.

## STUDY 10e: TEACHER-IMPLEMENTED OPTIMAL TEACHING ASSESSMENT STRATEGIES FOR PREACADEMIC LEARNING: INSTRUCTIONAL CONTROL OF MOTOR BEHAVIOR

(PIs: LeBlanc, Etzel, Kleinke, Cooper, and Ruggles)

This report is reported in Assessment Guides to Intervention, Question B., Study 13.

223

3) CHILD-TEACHER

The following section describes the studies directed by Allen to examine the interactions of teachers and children and to find ways of making those interactions more beneficial for the handicapped and at-risk child. These investigations, when considered with those in the previous section (Child-Child) and the following section (Child-Setting) were designed to provide a description of the ecology of the preschool classroom and its essential components: the teacher and the teacher's behavior, the child and the child's skill, and the setting itself.

## ECOLOGICAL GUIDES TO INTERVENTION

### QUESTION E, PART I: WHAT ARE THE PATTERN AND CONTENT OF TEACHER-CHILD INTERACTIONS?
(PI: Allen)

It has long been recognized that the behavior of significant adults has a powerful effect on how and what young children learn. More recently, the effect of a child's behavior on the significant adults has begun to be recognized and examined, particularly in infant studies. The purpose of this program of research was to study child-teacher interactions in a series of related investigations in the preschool to demonstrate how specific patterns of interaction can extend and elaborate behaviors deemed appropriate for each child, regardless of handicap, deficit, or delay.

Emphasis was given to developing a specific set of empirically determined teacher and child initiations and response patterns that could be organized into a facilitative teaching model. In the facilitative teaching model, the teacher not only responds to children's initiations but responds in such a way as to evoke another response from the child.

The important item in the teacher-initiates model is that the teacher always provides a response which has two functions: one, to reinforce the child for responding; and two, to evoke still another response from the child. The essence of the facilitative teaching strategy might be described as: a) how the teacher responds to child initiations; b) how the teacher initiates with the non- or low-rate initiating child; and c) what strategies the teacher uses to keep the interaction going in order to turn these casual or incidental exchanges into pleasurable teaching experiences for the child and for the teacher during free play activities.

It is posited that a combination of child-initiated and teacher-initiated sequences should result in several active learning opportunities for each child during each free play period. Thus, the thrust of this research was to determine facilitative teaching strategies and their effect on targeted behavior in young handicapped children.

Purpose. Descriptive data were collected to determine extent and kind of teacher-child and child-teacher initiations, modes of responding, and sequences of interactions.

Subjects/Settings. The primary group of subjects were the 18 children enrolled in the Edna A. Hill Child Development Laboratory (the University of Kansas) preschool classroom supervised by Allen. These children typically ranged in age (at the start of the school year) from 2 years, 8 months to 5 years, 10 months. The handicapped and at-risk children constituted approximately 25% of the total enrollment.

Observational Procedures. The observation code characterizes teacher and child interactions into the following types of behaviors:

1. praise
2. general statements
3. task-related statements
4. questions
5. instructions
6. motor behavior

Each statement was scored as an initiation or a response as it occurred in a 10-second interval scoring system. The scoring procedure was designed so that "chains" of verbal interactions between teacher and child can be followed from the time one of the two initiates until the interaction is terminated (when both participants fail to verbalize or when the interaction is interrupted by another person's entrance into the interaction).

## Summary of Initial Findings

Teacher/child interaction patterns. Analyses of data[1] collected on teacher/child interaction patterns over a two-and-one-half year period on 27 teachers and more than 45 children, both handicapped and nonhandicapped, indicate that in all of the program areas in the laboratory preschool that were under study, the following findings were evident:

1. Though there was considerable variability among teachers, teachers tended to initiate interactions with children at a much higher rate (35 to 60%) than children initiated to teachers.

2. These interaction episodes were of short duration, with a predominance of one-episode chains, regardless of who did the initiating--teacher or child. In other words, when children initiated to teachers, teachers more often than not failed to respond; and when teachers initiated to children, they frequently failed to elicit a response from the child they were addressing.

---

[1] Though these data were subject to some inconsistency in terms of maintaining an experimentally rigorous level of inter-rater reliability, the data have proven to be highly functional for classroom use as will be described subsequently.

3. Two-episode chains were the next most highly scored form of teacher/child exchanges (approximately 30 percent of all initiations). Though these were far fewer in number than one-episode chains, it appears there was little extension and elaboration on teachers' part; when teachers initiated and children did respond, teachers did not provide feedback to the child as to the relevance and value of the child's response; and when children initiated and teachers responded, children did not attempt to evoke further exchange with the teacher, nor did teachers attempt to promote a third component from the child.

4. Interaction chains of longer duration--3, 4, and 5 episodes--fell off proportionately. In other words, there were fewer 3-link chains than 2, fewer 4 than 3, and many fewer 5 than 4, with 5-link chains reaching a near-zero percent level.

5. Though types of initiations (general statements, praise, questions, instructions, and task-related comments) varied from teacher to teacher, certain characteristics predominated across all teachers: initiations to children by questioning accounted for approximately 40 percent of teachers' initiations to children; instructions averaged 30 percent; task-related comments averaged 20 percent; praise and general statements accounted for the remainder. Types of initiations did not appear to be related to increased probability of a resulting second or third episode thereby continuing the chain. In other words, questions as initiating variables did not appear to be any more conducive to continuation of the chain than did instructions or task-related statements.

6. Few discernible differences were apparent in the types and patterns of interactions between teachers and children as a function of a teacher's experience or length or kind of training. That is, experienced teachers were no more likely to evoke a greater number of child initiations, respond more frequently, or engage children in elaborated chains of interactions than were inexperienced teachers. Or, to put it another way, inexperienced teachers, consciously or unconsciously, appear to model the teacher/child interactions of the experienced teachers with whom they work.

## Observational Problems and Possible Solutions

Teacher/child interaction data: This code, for all of the early months of experimental working and reworking, proved to be extremely resistant to obtaining a level of inter-rater reliability deemed sufficiently high (75% and above) to qualify for experimental rigor. Initially, this experimenter resisted simplifying the code for two reasons: 1) she had a long history of always being able to get a high degree of inter-rater reliability on equally complex codes; and 2) she felt that certain key variables could not be studied except by maintaining the complex breakdown of behaviors that characterized the code.

After several semesters of concentrated effort, during which inter-rater reliability could not be brought above 60% on a consistent basis, various alterations were made in the system. Following are examples of some of the code changes that were made:

> "Interruptions" were dropped as a part of the data system, as this category had been one of the most difficult to score; and it was decided that the basic data analyses would not suffer significantly without this category.
>
> The "group" category was expanded in order to further refine individual child/teacher interaction episodes and eliminate confusion in those instances where the teacher's initiation was unclear as to whether it was addressed to one or several children.
>
> The motor response category (another one that had proven itself to be excessively troublesome) was taken out; but then returned under a stricter set of rules when it became obvious that it would cause even more problems if eliminated entirely. In addition, a priority system was established under which "motor" was not scored if other responses occurred within the same interval.
>
> Each set of responses were looked at in terms of its smallest parts and redefined until, one by one, each was brought individually to an acceptable degree of reliability; in some instances, this meant tightening the definitions and in other instances, certain leniencies were introduced.

While these changes in the data collecting system did result in the loss of certain data, inter-rater reliability scores were improving by the time the experimenter went on leave in the Spring of 1981.

Once the code seemed to be on the way to yielding greater reliability scores, an overhaul in observer training procedures was undertaken. New observers were trained on only one parameter of a response at a time and were required to bring each parameter (or response component) to an 85% reliability level before another response category was added to the training system. The problem with this type of training, even though it did seem to be working reasonably well, was that the length of time required to train each new observer to full code capability seemed excessive. The excessive time investment would be particularly difficult to manage in situations where there might be a high turnover of observers--an observer might leave (e.g., semester end), just about the time that he or she had reached an acceptable level of reliability.

The changes that have just been outlined in the code itself, and in the observer-training procedures, appeared promising enough to predict that the system can become reliable and efficient, and that the investigation on teacher/child interaction patterns that is central to the teacher training materials proposed by this investigator can be continued upon her return to the laboratory preschool following her leave of absence.

Methodological Contributions. The research issues that were discussed above can be viewed as having methodological significance in teacher-training activities and in the final publication to be prepared for dissemination of the facilitative teaching model. The values of each set of methodologies will be highlighted below.

An effective means of analyzing teacher/child interactions provides teachers and teacher-trainers with specific information about important aspects of teachers' behaviors in facilitating child learning. Questions such as the following can be answered:

1. Is the teacher dominating the learning environment, thereby relegating children to inappropriately passive roles in the learning process (in other words, do teacher-initiations predominate)?

2. When teachers initiate an interaction with a child, do they evoke a response from the child? And, assuming a response, does the teacher respond, in turn, in a way that evokes further responding on the part of the child, thus, ensuring that the child will return frequently for additional interactions with the teacher?

3. When children initiate an interaction, does the teacher make use of those valuable "teachable moments" by responding to each child who initiates?

4. What kind of a response does the teacher make to a child initiation? Does it result in further responding from the child? In other words, does the teacher reinforce the child for initiating an interaction; and does the teacher do it in such a way that the child continues to be involved in a teaching/learning exchange?

5. What kinds of teacher behavior results in an increase in child initiations and in longer chains of teacher/child interactions (both of which can be perceived as signs of more active involvement of the child in the learning process)?

6. Do teachers respond differently, both quantitatively and qualitatively, to handicapped, delayed, and otherwise "different" children than they do to those who are perceived as developing normally?

Many other aspects of teacher/child interaction patterns should present themselves for study and for translating into teacher-training and teacher-evaluation procedures through the adaptation of the methodological strategies discussed above. It seems quite likely that the procedures will be of particular usefulness with all types of atypical children in that these children so often fail to learn as readily in a nonstructured or less systematic environment. Teachers must learn to respond to these children on a regular, systematic basis with the kinds of responses that ensure further responses from the atypical child. These children simply cannot accommodate the "misses" as can normally developing children who are often able to control or operate on their own learning environment in ways that many handicapped children cannot.

## QUESTION E, PART II: CAN TEACHERS, WHILE ACTIVELY ENGAGED IN TEACHING, COLLECT VALID DATA? IF SO, HOW CAN THE DATA BE USED FOR PROGRAM PLANNING AND REMEDIAL INTERVENTIONS? (PI: Allen)

Purpose. The purpose of this series of studies (not included in the original proposal), was 1) to ascertain if teacher-collected data (on individual children) were validly reflecting the children's participation in specific classroom interest centers, and 2) to analyze and apply these teacher-collected data in providing a more effective learning environment for the group as a whole as well as for individual children with special needs.

Subjects. The children, aged 2 and 1/2 to 6 years, were enrolled in one of the preschool classrooms in the Edna A. Hill Child Development Laboratory at the University of Kansas. During the school year that the study was in progress there were 15 participating children, 3 of whom were considered to be at developmental risk.

Data Collection. Data were collected by individual teachers using a prepared data sheet. Each teacher was assigned 4 to 7 children; at the sound of an audible tone (approximately every 5 minutes) each teacher stopped momentarily, scanned for each assigned child and marked on the data sheet where each child was and the level of the child's participation at that moment.

Experimental Design. Descriptive data was collected for two purposes:

1. To ascertain validity of the teachers' data;

2. To ascertain patterns of usage of the various interest centers in the classroom, and to determine levels of individual child usage.

Single N studies (3) using various combinations of an ABA design were used.

Results. This series of studies was based on teacher-collected data; a first research task, therefore, was to establish the validity of such data--that is, did the data collected by teachers while actively teaching reflect the actual behaviors of children? To answer this question, observer-collected data were compared with teacher-collected data on three different time-sampling intervals. The mean validity scores for each condition were 86 percent, 81 percent, and 89 percent. Thus, the teacher-collected data compared favorably with the observer-collected data in reflecting realistically:

1. The number of centers that each child visited each day;
2. The centers in which children became actively involved;
3. The quality of each child's engagement in the various interest centers in which he or she became involved.

Once the validity of teacher-collected data was established, the next issue that was addressed was how teachers might use their data to make curriculum decisions. Thus, the data that were collected on a child-by-child and center-by-center basis were analyzed according to each child's presence and level of engagement in each center. These data can be summarized as follows:

Percent of Time Spent in Centers

| Centers* | On Task | Idle | Inattentive | Inappropriate |
|---|---|---|---|---|
| Creative Arts | 90% | 5% | 4% | 1% |
| Dramatic Play | 89% | 7% | 3% | 1% |
| Blocks | 84% | 8% | 4% | 4% |
| Manipulatives | 89% | 3% | 6% | 1% |
| Book Corner | 88% | 0% | 12% | 0% |

---

*Centers are listed in order of amount of child-patronage.

Based on such analyses (for the group as a whole as listed above, and for children as individuals data are too diverse and complex to summarize here), teachers were able to make informed decisions regarding program needs for individual children. The outcome of such decisions resulted in a series of single N studies in which particular problems in particular children were addressed and the amount and kind of teacher attention was assessed.

Implications for Use. Methodologically, the teacher-collected data system has highly practical implications for classroom use. It has proven itself to be a simple system, yet valuable in planning classroom programs and individual remedial programs. A partial list of advantages appears below.

1. Inexperienced teachers can become proficient in collecting these useful data on 5 to 9 children with two weeks or less of training in conjunction with their teaching commitments.

2. The data collection procedures are easily assimilated into the regular teaching responsibilities with no loss of a teacher's control of the classroom or interference with one-to-one activities with particular children.

3. The procedure is most economical of teachers' time, both in the actual collection procedures and also in the ease with which the data are analyzed and translated into program practices.

4. Teachers need never "fly blind." They have their data readily available to answer an assortment of questions about children and the effectiveness of any remediation or teaching program which they may institute.

5. Teacher trainers have specific information to use with student teachers; and all teachers have concrete objective evidence with which to do self-critiquing of the effectiveness of their efforts.

## 4) CHILD-SETTING

In the following section, aspects of the physical ecology of the preschool classroom are examined. The first series of investigations was designed to determine the differences between a therapeutic classroom and the normal preschool and primary grade classrooms in which children would later be enrolled. These studies focused on general setting variables, such as class size, rate of teacher attention, and scheduling.

The second series of investigations was designed to investigate discrete instructional material variables that might affect the child's responses. Workbooks, formats, mastered tasks, and physical aspects of stimulus materials comprise a class of environmental variables specific to preacademic learning settings. Differences in these setting-specific events may be particularly critical to the handicapped child.

## ECOLOGICAL GUIDES TO INTERVENTION

### QUESTION F: HOW CAN TRANSITION FROM THERAPEUTIC TO NORMAL CLASSROOMS BE FACILITATED FOR HANDICAPPED CHILDREN? (Investigators: Rowbury and Baer)

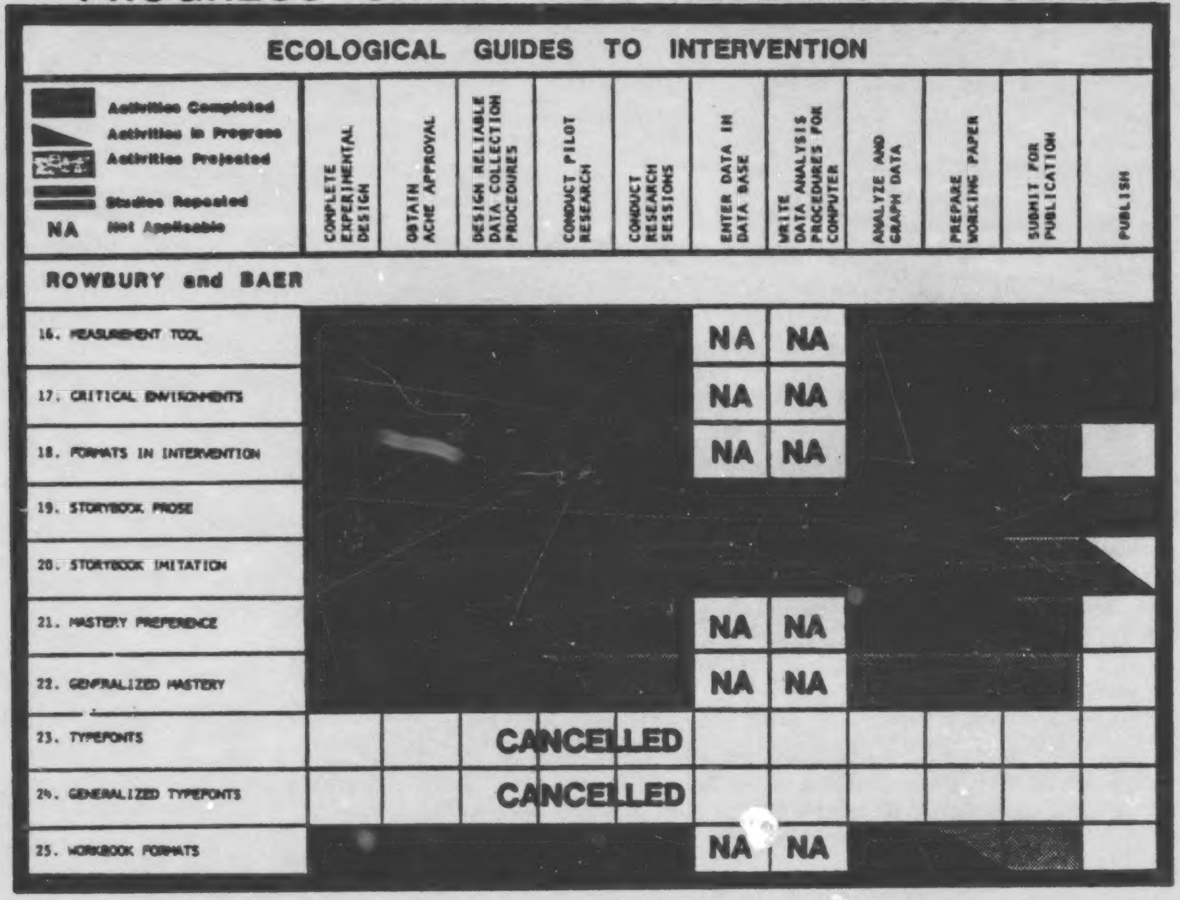
### Statement of the Problem

The mainstreaming provisions of Public Law 94-142 call for handicapped children to be educated with their nonhandicapped peers to the greatest extent possible. While they receive many of their services in special instructional settings, handicapped children often return to regular class settings for much of their educational program. When this occurs, they are faced with a transition from one instructional environment to another, and they usually are expected to transfer their newly acquired skills from one setting to the other. Such transitions might take the form of: (a) an initial move from a therapeutic preschool classroom to a normal public school kindergarten or first grade or (b) daily movement from a normal public school classroom to a part-time resource room program and back. In both cases, the child moves from one instructional setting to another, and in both, the transitions might very well be difficult, especially for a handicapped child. There are several reasons for this.

First, there are data to indicate that transitions of various kinds tend to interfere with children's performance. For example, Carden-Smith (1980) found that even transitions from one activity to another within a school day can affect the conduct of preschool children. Children who were otherwise behaving in an acceptable manner during regularly scheduled activities tended to become more disruptive and noncompliant during inter-activity transition periods than they were during the activities themselves. This finding is possibly attributable to the reduced levels of structure and monitoring which typically prevail during these transition times.

Second, research strongly suggests that behavior change achieved in one instructional setting (e.g., a resource room) is not likely to generalize to other settings (e.g., a regular classroom) or even to maintain

# PROGRESS CHART FOR RESEARCH STUDIES



| ECOLOGICAL GUIDES TO INTERVENTION | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ■ Activities Completed<br>◣ Activities in Progress<br>▨ Activities Projected<br>═ Studies Repeated<br>NA Not Applicable | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
| **ROWBURY and BAER** | | | | | | | | | | | |
| 16. MEASUREMENT TOOL | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | ■ |
| 17. CRITICAL ENVIRONMENTS | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | ■ |
| 18. FORMATS IN INTERVENTION | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ▨ | |
| 19. STORYBOOK PROSE | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 20. STORYBOOK IMITATION | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ▨ | ◣ |
| 21. MASTERY PREFERENCE | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | |
| 22. GENERALIZED MASTERY | ■ | ■ | ■ | ■ | ■ | NA | NA | ▨ | ▨ | ▨ | |
| 23. TYPEFONTS | | | CANCELLED | | | | | | | | |
| 24. GENERALIZED TYPEFONTS | | | CANCELLED | | | | | | | | |
| 25. WORKBOOK FORMATS | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ▨ | |

FIGURE 24

233

over time in the training setting without explicit programming addressed to this goal. Certainly widespread and long-term effects are *possible*, but previous work in this area (cf. Baer, Wolf, & Risley, 1968) tells us that we should not expect them.

Third, handicapped children, their regular class teachers, and their regular class peers *can* help to support new behavior in the regular classroom, but they are unlikely to be prepared to do so without explicit training. If they are not trained to support the child's behavior change, the child is not likely to succeed in the regular class and might be referred back to special education for a more highly structured program.

For these reasons, some support or structure must be provided if we expect handicapped children to make successful transitions from special to regular educational programs. Cultivating available resources (e.g., Russo & Koegel, 1977; Stokes, Fowler, & Baer, 1978) and systematically altering the structure of a work situation (e.g., Axelrod, Hall, & Tams, 1979; Glazzard, 1981) are two approaches which seem to hold considerable promise for supporting behavior in one setting which has changed initially in another setting. This research area has explored these variables.

## STUDY 16a: AN INTERVAL OBSERVATION SYSTEM FOR ASSESSING CHILD BEHAVIOR, TEACHER BEHAVIOR, AND ECOLOGICAL VARIABLES
(PIs: Carden-Smith and Fowler)

*Purpose*. An observation technique was developed to identify critical classroom factors that affect child work and participation within and across classroom settings. This observation system has helped pinpoint when and where children are successful or are having problems in classrooms. Once these variables have been identified, intervention programs can be instituted to help the child in his or her current setting or in making smooth transitions to future settings.

*Subjects*. Eleven children ranging in age from 3.3 to 6.3 years served as subjects. Six had been referred for treatment of learning and behavior problems; the remaining five were classmates of the six referred children, selected at random from a pool of children who had not been referred for special services.

*Setting*. The study was conducted in ordinary preschool and kindergarten classrooms and in a special preschool for children with learning and behavior problems.

*Data Collection*. A continuous 10-second interval recording system was used to observe subjects. Data were taken during the following periods: free choice, large group, tutor group, preacademics, and transition times in both the preschool and kindergarten settings. The data were collected on child behaviors, teacher behaviors, and classroom variables. Child behaviors included appropriate, inappropriate, and unoccupied behavior. Teacher behaviors included general teacher attention, teacher instructions, and transition instructions. Classroom variables included group size, teacher presence, interaction or noninteraction group, and teacher or child pacing. Also, the formats of games, songs, stories, lectures, or discussions were noted.

Results. The observation procedures have proven to be reliable across all behavioral and ecological categories, with all occurrence reliabilities greater than 85%.

Discussion. The observation procedure is a reliable measure of child behaviors and the formats of the classroom. This measurement system may then be used to assess covariations between child behavior problems and classroom format variables. That is, the question now becomes, "Under what circumstances do children seem most likely to have difficulties?" (cf. Study 17).

Recommendations for future research. a) Determine if the observation system can be adopted by school personnel for use in the classroom for program planning; and b) Develop a similar code focusing on the quality and variety of teacher behaviors directed toward special needs of children in regular and special classrooms.

## STUDY 16b: A SCANNING PROCEDURE FOR ASSESSING CHILD WORK BEHAVIORS

(PIs: Rowbury, Baer, and Durgan)

Purpose. The purpose of this study was (a) to develop an observation system sensitive to child work behaviors during preacademic periods, and (b) to examine the utility of a scanning observation technique.

Subjects/Settings. Four subjects in each of the three classrooms worked as a preacademic group (Total N = 12). Each group contained one to four children identified as having learning or behavior problems. Two of the 12 subjects were observed in two classrooms in order to further assess the sensitivity of the observation system. Of the three classrooms used as observation sites, two served children with learning and behavior problems; the third classroom was a regular preschool classroom.

Data Collection. Subjects were observed on a 15-second scan for 10 minutes. The observation rotated clockwise around the table. Data were collected on on-task, off-task, disruptive, and other work-related behaviors.

Results. Results indicated that the observation system was sensitive to differences across children (e.g., Figure 25) and within children across settings (e.g., Figure 26). The results also suggested that data obtained by scanning were very similar to data obtained through continuous observation ($r=.98$, $p<.001$).

Discussion and Recommendations. The observation code and recording system have proven effective in monitoring preacademic work behavior. Analysis can now be made on format of presentation, task levels, and peer groupings.

Individual Differences In Work Behaviors

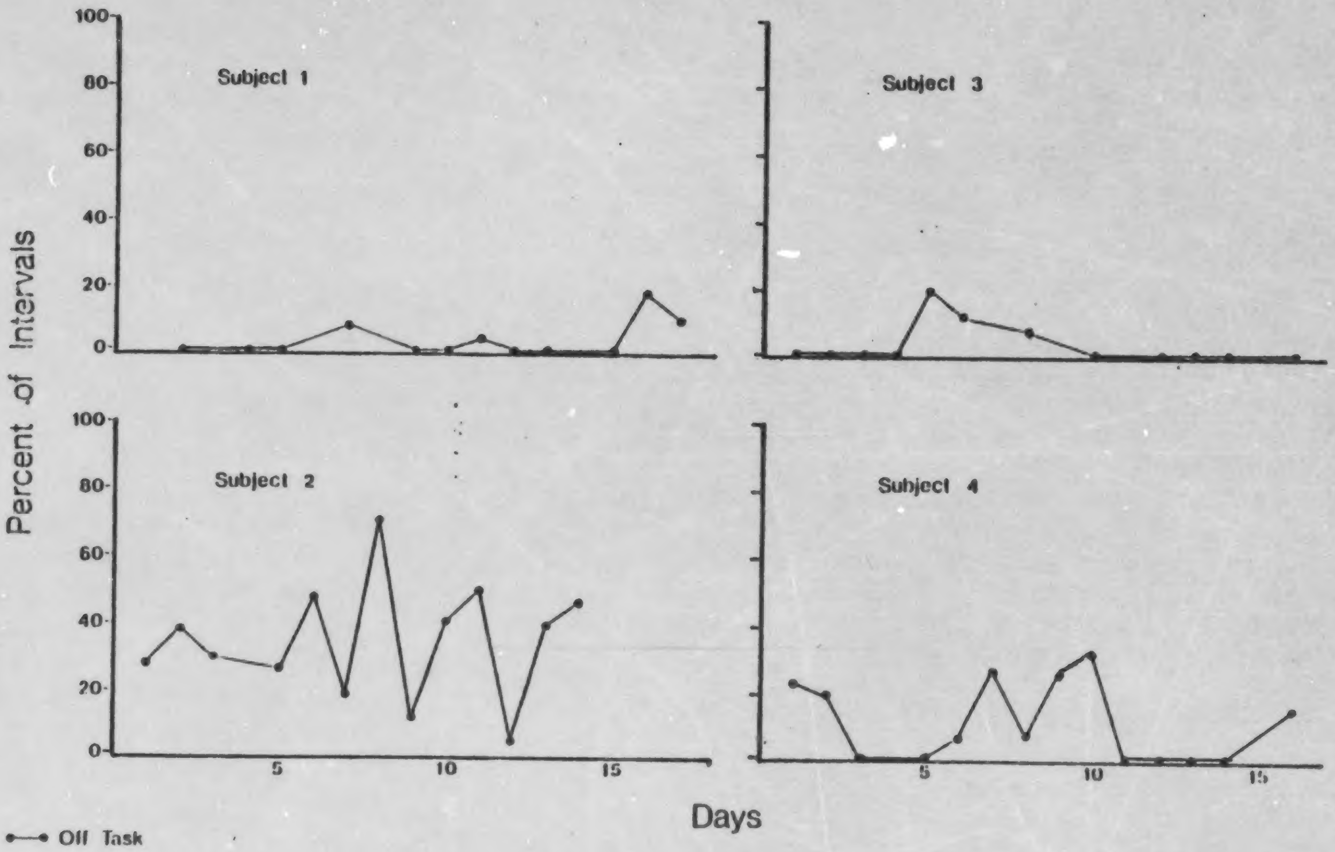


Figure 25

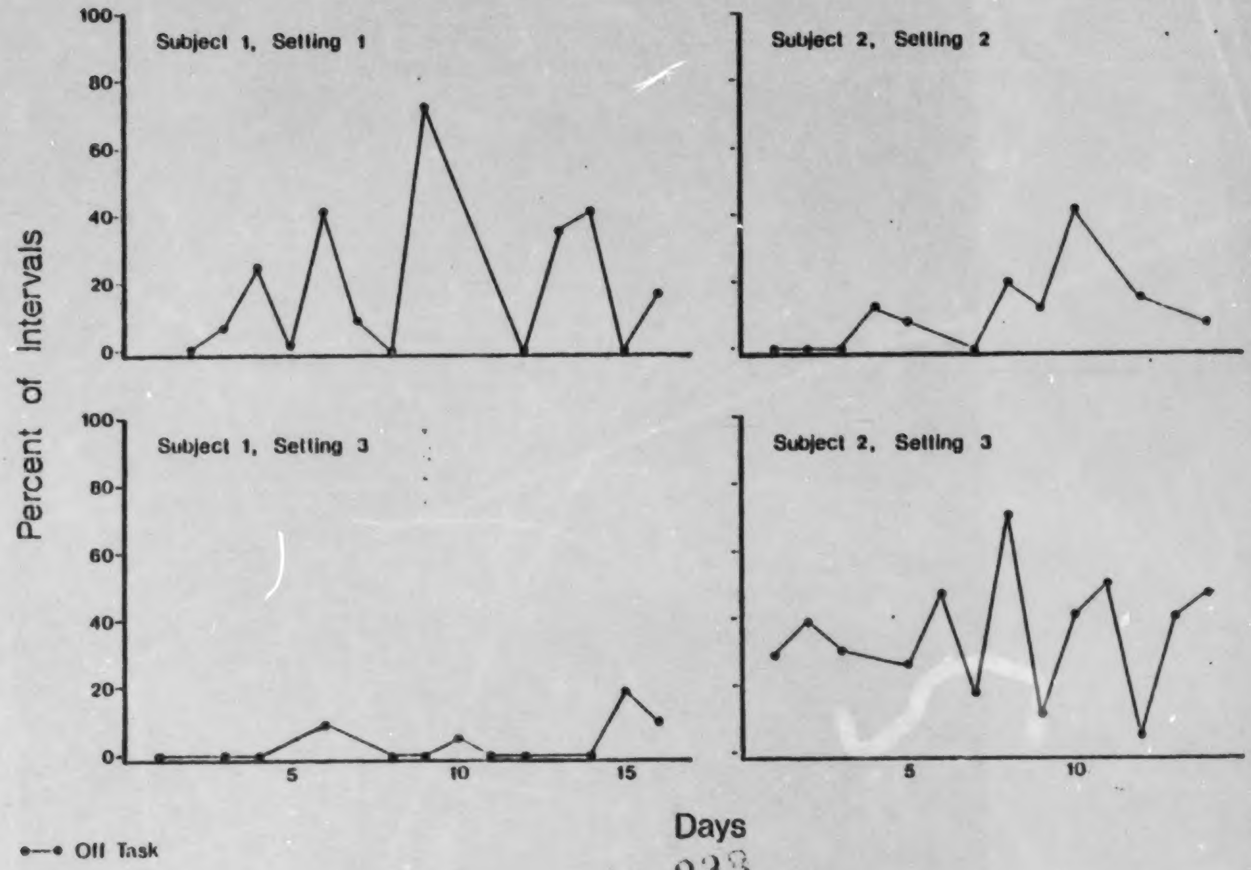


Figure 26

Two Subjects Enrolled in Two Different Settings

## STUDY 17a: ASSESSMENT OF CRITICAL ENVIRONMENTAL LEARNING FORMATS ACROSS NORMAL EARLY CHILDHOOD, NORMAL PUBLIC SCHOOL KINDERGARTEN, AND PRIMARY SPECIAL EDUCATION CLASSES

(PIs: Rowbury, Baer, Carden-Smith, and Fowler)

Purpose. The purpose of this study was to identify critical learning formats that influence the success or failure of children in classroom settings. Variance in ecological segments (e.g., activity periods and instructional formats) are examined within and across classroom settings.

Subjects/Setting. A total of 11 children served as subjects in the study. Six children were referred for learning or behavior problems and five were randomly selected children nonreferred. Each child was observed in his or her preschool or kindergarten classroom.

Data Collection Procedures. Data were collected for approximately 5 hours each day for 5 days on each child. The observation system was the same as that developed in Study 16b: Child behaviors observed included appropriate, inappropriate, and unoccupied behavior. Teacher behaviors observed included general teacher attention, teacher instructions, and transition instructions. Classroom variables noted included group size, teacher presence, interaction or noninteraction group, and teacher or child pacing. Data were taken during free choice, large group, tutor group, preacademics, and transition times.

Results. Occurrence reliability was above 85% on all behavioral categories. The data collected suggest that:

1. Inappropriate behavior was examined along several dimensions to determine the manner in which children behaved inappropriately and the conditions under which this behavior occurred. Rate of misbehavior clearly differentiated referred from nonreferred children (see Figure 27), as did related measures, such as the average length of an episode of misbehavior and the type of misbehavior. Episodes of inappropriate behavior by referred children averaged one minute but could last up to six minutes. In contrast, nonreferred children were never inappropriate for more than one and one-half minutes and generally averaged no more than 20 seconds of misbehavior (see Figure 28). Referred children also exhibited more types of inappropriate behaviors than their classmates: On the average each referred child exhibited 14 forms of inappropriate behavior compared to an average six forms of misbehavior by their nonreferred classmates (see Figure 29).

2. The combination of higher rates, longer episodes, and greater variety of behavior may have been largely responsible for the higher rates of teacher attention received by referred children. In general, teachers attended to referred children two to four times more often than they attended to nonreferred children (see Figure 30). Furthermore, the frequency of teacher attention was related to the frequency of inappropriate behavior. The more inappropriate a child was, the more attention the child tended to receive (see Figure 31).

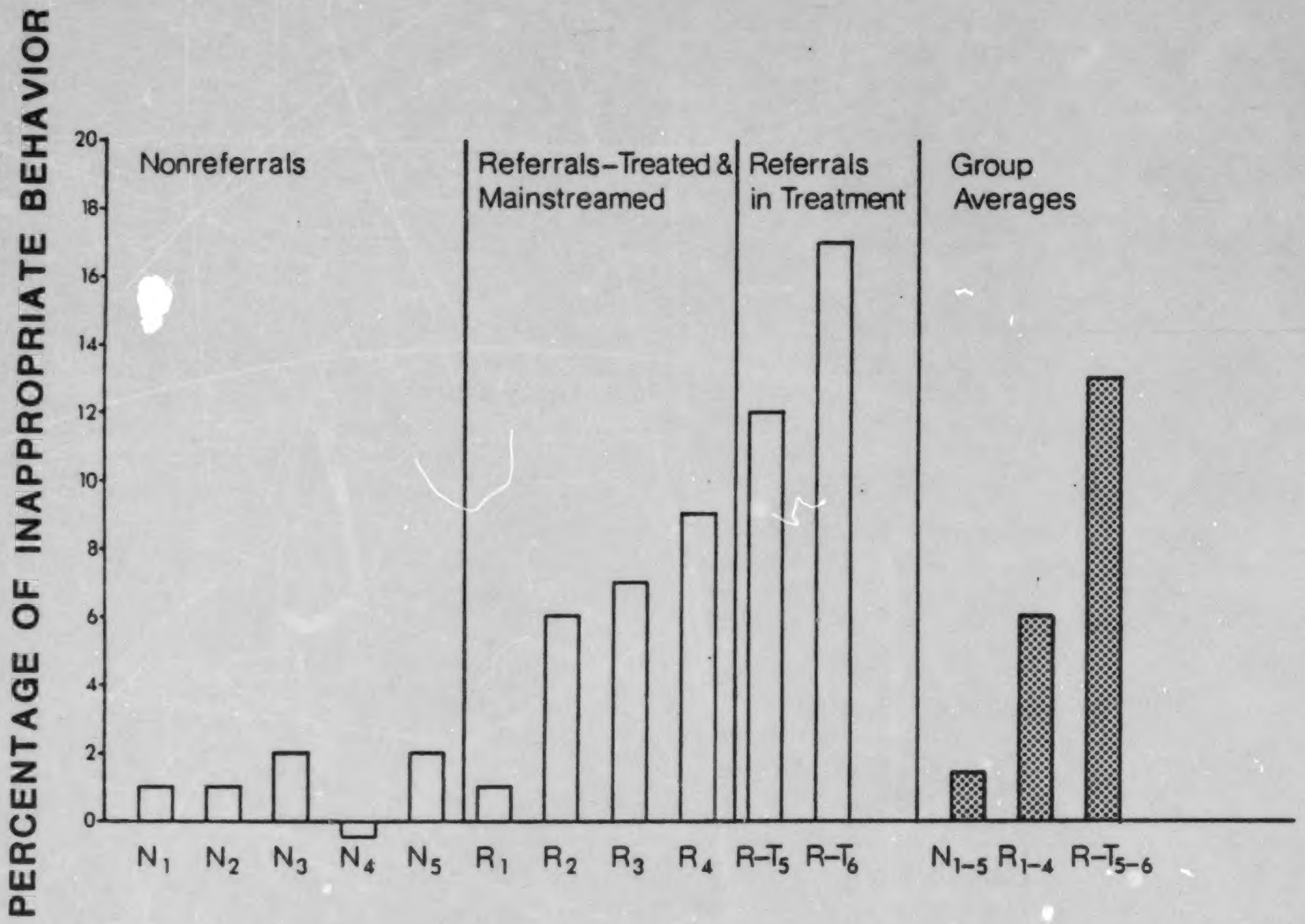


Figure 27. The percentage of time that referred and nonreferred children engaged in inappropriate behavior.

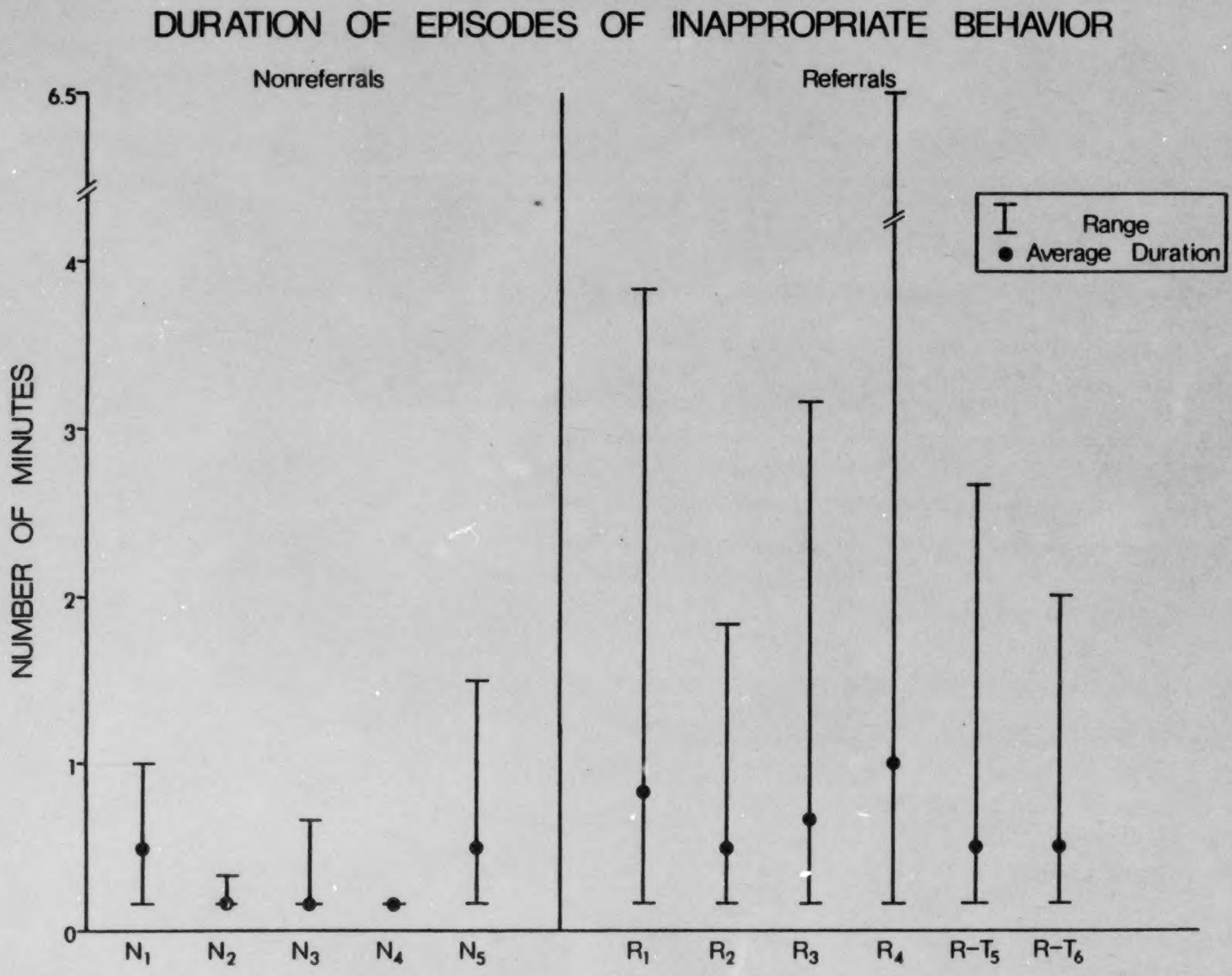


Figure 28. The large and average duration of episodes of inappropriate behavior exhibited by referred and nonreferred children.

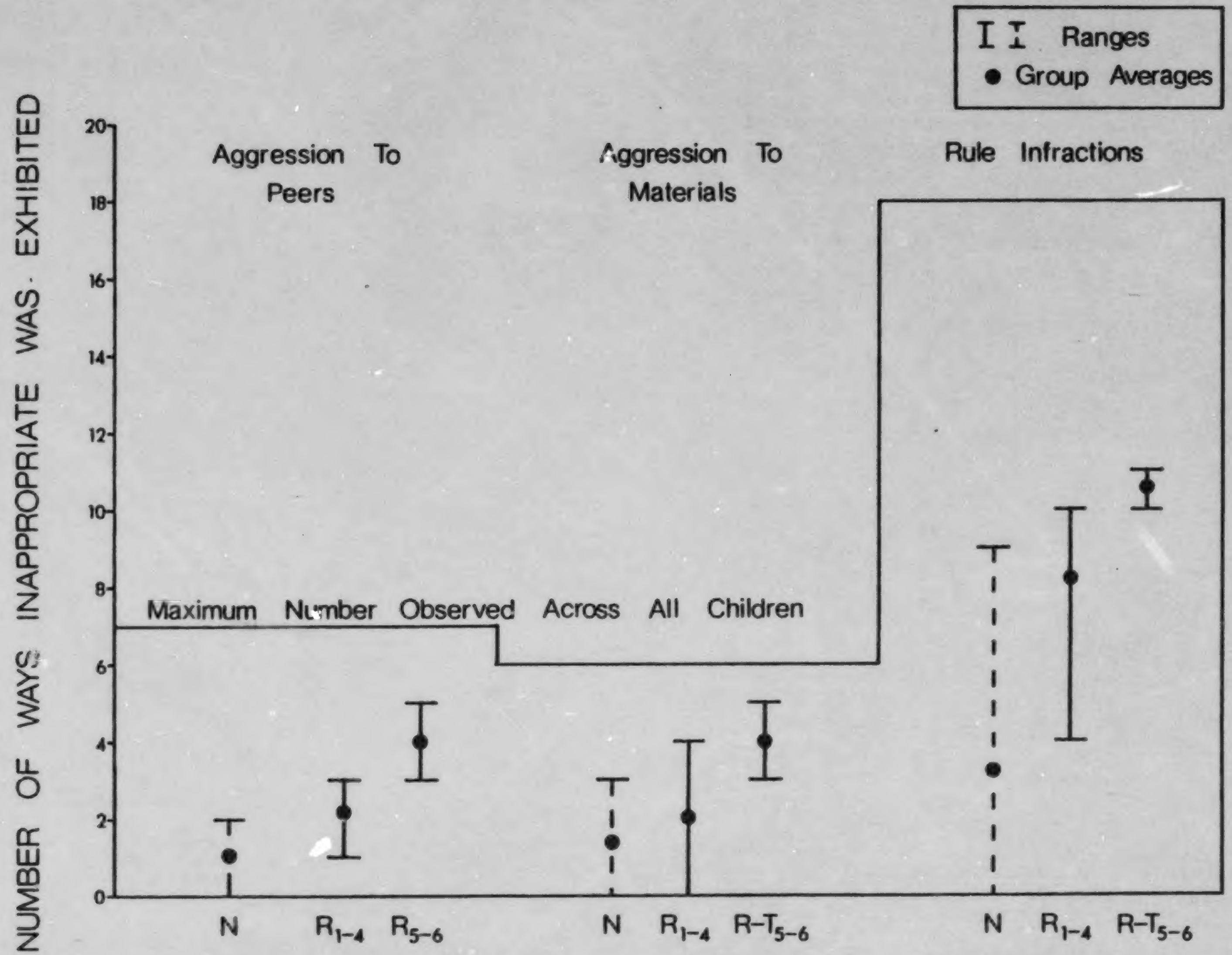


Figure 29. The range and average number of ways in which referred and nonreferred children exhibited inappropriate behavior.

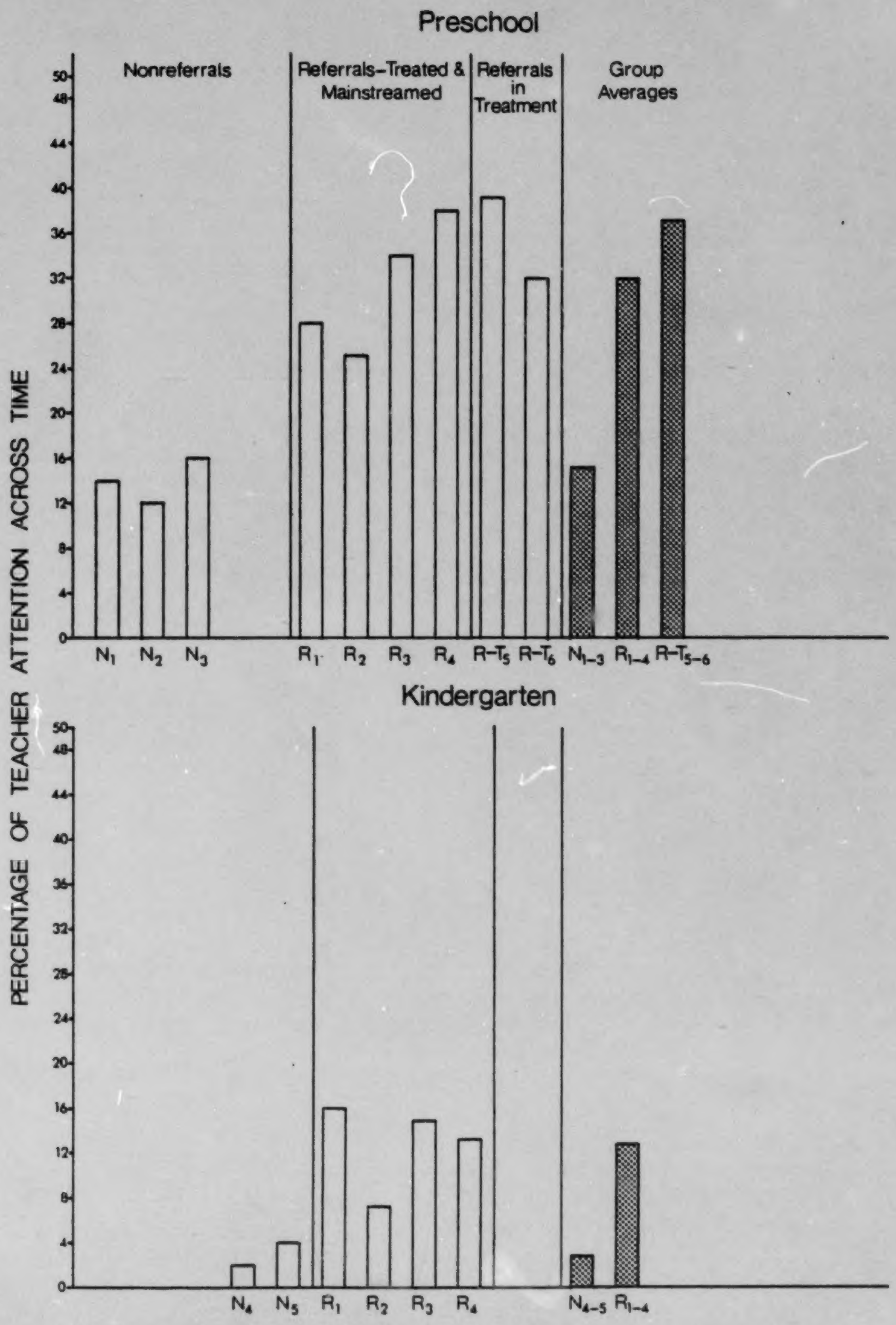


Figure 30: The percentage of time that teachers attended to referred and nonreferred children.

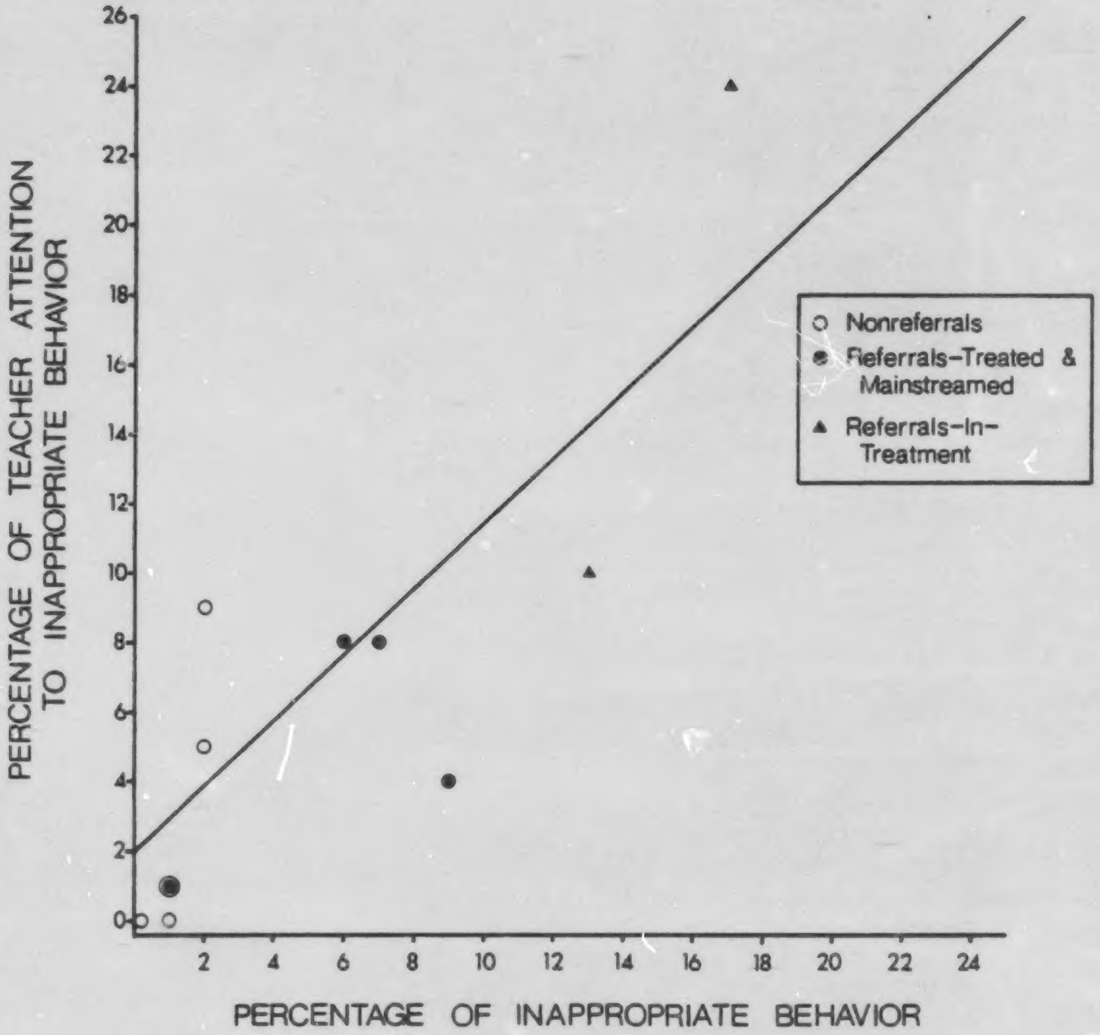


Figure 31: A scatterplot representation of the relationship between proportion of teacher attention directed to inappropriate behavior and the rate of inappropriate child behavior.

3. Results in this study indicated, that environmental variables, alone (i.e., group size, teacher presence or absence, and the presence or absence of social interaction in an activity), did not produce consistent differences in behavior across the children. The content of the activity and perhaps other factors not measured by this observation system seemed to override these environmental factors.

Discussion. These data suggest that the observation system is reliable and sensitive to differences in child behavior across settings and across children. The results suggest that classroom variables alone, such as group size, are not related to inappropriate behavior. Variables controlling child behavior appear to be more complex and specific to each child.

Recommendations. a) Additional data are needed from a larger sample of children to determine if these findings are representative of mildly handicapped children. In addition, other measures which directly reflect educational and social performance should be examined in greater detail to determine the extent to which children can deviate from their peers, yet benefit from an integrated placement (cf. Walker & Hops, 1976; Kazdin, 1977; Van Houton, 1979). For example, a child's ability to complete academic assignments and to interact in a positive manner with peers may affect whether a child remains in an integrated setting.

## STUDY 18: INCORPORATION OF ENVIRONMENTAL FORMATS INTO INTERVENTION STRATEGIES

### 18a: Positive Peer Pressure: The Use of Peer Monitors to Promote Appropriate Transition Behaviors

(PIs: Carden-Smith and Fowler)

Purpose. The use of peers as change agents in promoting or modeling desired behavior change is becoming increasingly common in applied settings. In large classrooms, peers can be valuable resources to implement treatment procedures. Peer-managed token systems have demonstrated that young children can monitor and promote behavior change in peers using token reinforcement procedures. The present studies examined the effectiveness of a peer-monitored system in reducing disruptive behavior and increasing participation during the clean-up period of two summer kindergarten classrooms. Additionally, the studies compared the effect of the peer-monitored token system with a teacher-implemented system. Additional analyses examined the accuracy with which peers provided consequences for the appropriate or inappropriate clean-up behavior of their classmates.

Subjects/Setting. Three classrooms, each containing nine children ranging in age from 6 to 7 years, served as subjects. The three kindergarten classrooms were for children referred for academic and behavioral remediation.

Data Collection. Disruptive behavior, participation, and nonparticipation of the three most troublesome children in each class were measured, using continuous 5-second intervals. Teacher and peer-monitor instructors also were observed. Checklists of data were used with all children to rate the acceptability or unacceptability of their transition behaviors during three daily segments of transition.

Experimental Design. Two designs were employed: a reversal of treatment design (ABAC) in Experiment I and multiple baseline across subjects in Experiments II and III.

Procedure.

Experiment I. During baseline and experimental conditions, the children were instructed to do the following tasks: (a) go to one free choice area and help put the materials on shelves, (b) use the bathroom within a 3-minute period, and (c) pick out a book and look at it quietly until the next lesson began.

During baseline, the teacher instructed the children on the three transition requirements but there were no contingencies for fulfillment of the requirements. During the first treatment condition, Teacher Monitoring, the teacher initiated a token system that consisted of giving each child a check for fulfilling each of the three transition responsibilities. Checks were marked on the chart at the beginning of the next lesson. Children who earned all three checks could vote on and participate in a special activity during recess. Children who earned two checks could go outside but could not help choose the special activity. Children with one or no checks had to stay inside during the outdoor activity.

In the Peer Monitoring treatment condition, the teacher informed the children that team captains would watch them during the transition and give them their checks. Child responsibilities and reinforcement requirements were the same as in the Teacher Monitoring condition with the exception that now the team captains gave the checks. Children who received three checks were eligible to be a team captain on the following day.

Experiment II. Following a baseline (identical to the baseline in Experiment I) a peer-monitoring condition (also identical to the peer-monitoring condition in Experiment I) was implemented. During this condition the team captains awarded points for participation in transition; corrective feedback regarding accuracy of point awards was provided by the teacher during the first phase of this condition. Corrective feedback subsequently was withdrawn during the second phase.

Experiment III. Following baseline, a self-monitoring condition was implemented. As in the peer-monitoring condition, children were assigned to teams and team captains were appointed. However, each child was instructed to award points to himself or herself. Team captains were instructed to only provide corrective feedback on the accuracy of the point awards. In a second phase, corrective feedback by the team captains was withdrawn.

Results. Results of Experiment I indicated that the peer-monitored procedure was as effective as the teacher-implemented procedure in reducing disruptive behavior and nonparticipation (see Figure 32). Furthermore, the accuracy with which peers and teachers awarded consequences was comparable.

Results for Experiment II indicated that decreased levels of disruptive behavior and nonparticipation were maintained during the no-feedback condition (see Figure 33). However, the accuracy with which peers awarded consequences was lower during the no-feedback condition. Teacher instructions decreased to an average of two to three per day during the no-feedback condition.

Results for Experiment III likewise suggest that the self-monitoring condition with corrective feedback produced decreases in disruptive behavior of the three most troublesome children. These reductions are maintained when feedback is withdrawn, although disruptive behavior becomes more variable (see Figure 34). The accuracy with which children awarded themselves points during the self-monitoring phases was lower than in the preceding two experiments. Children were less likely to withhold points from themselves for disruptive behavior.

Discussion. In summary, results suggest that not only can children monitor a classroom token system effectively (Experiment I), but they can also implement the program to initiate behavior change (Experiment II, III). The use of peers as behavior-change agents in classroom settings is an efficient method of implementing behavior-management programs with minimal teacher effort.

### 18b: A Procedure for Increasing On-Task Behavior During Preacademics (PIs: Rowbury, Baer, and Durgan)

Purpose. A procedure was sought that would reduce rates of inappropriate behavior during preacademic groups.

Subjects/Settings. Subjects for the study were 16 children enrolled in preschool and kindergarten classrooms. Data were collected in two preschool and two kindergarten classes.

Data Collection. Data were collected for on-task, disruptive, and off-task behaviors during group and individual instruction formats.

Following baseline a self-monitoring procedure was implemented. Children were given a calendar base with five to seven numbered cards. At unpredictable intervals, averaging 30 seconds, a tone sounded. The children were instructed to turn a card if they were on-task when the tone sounded. Back-up toys were available to children meeting a specified criterion of card turning. A multiple baseline design was used.

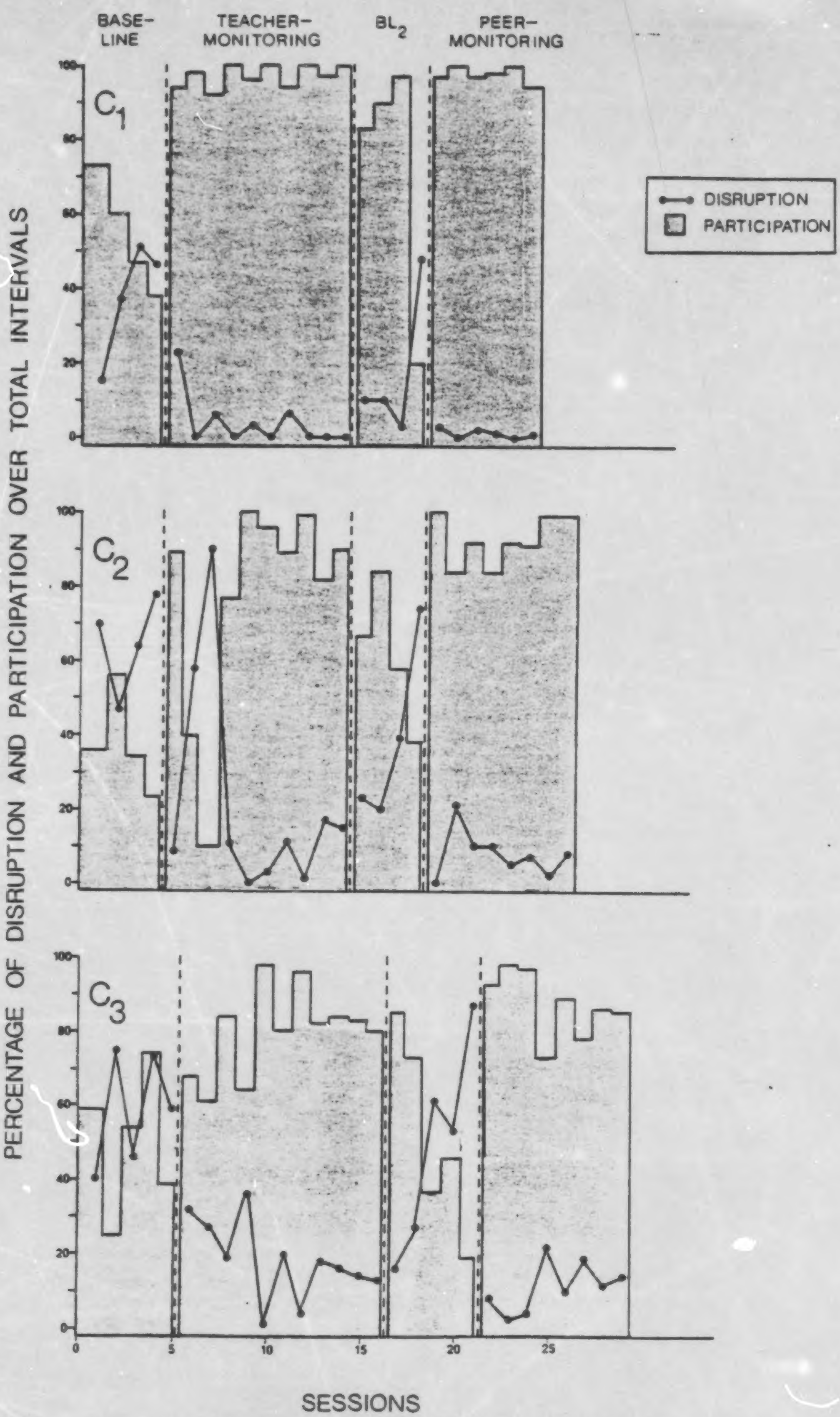


Figure 32. Percentage of disruptive behavior and participation exhibited by the three most troublesome children in Experiment I.

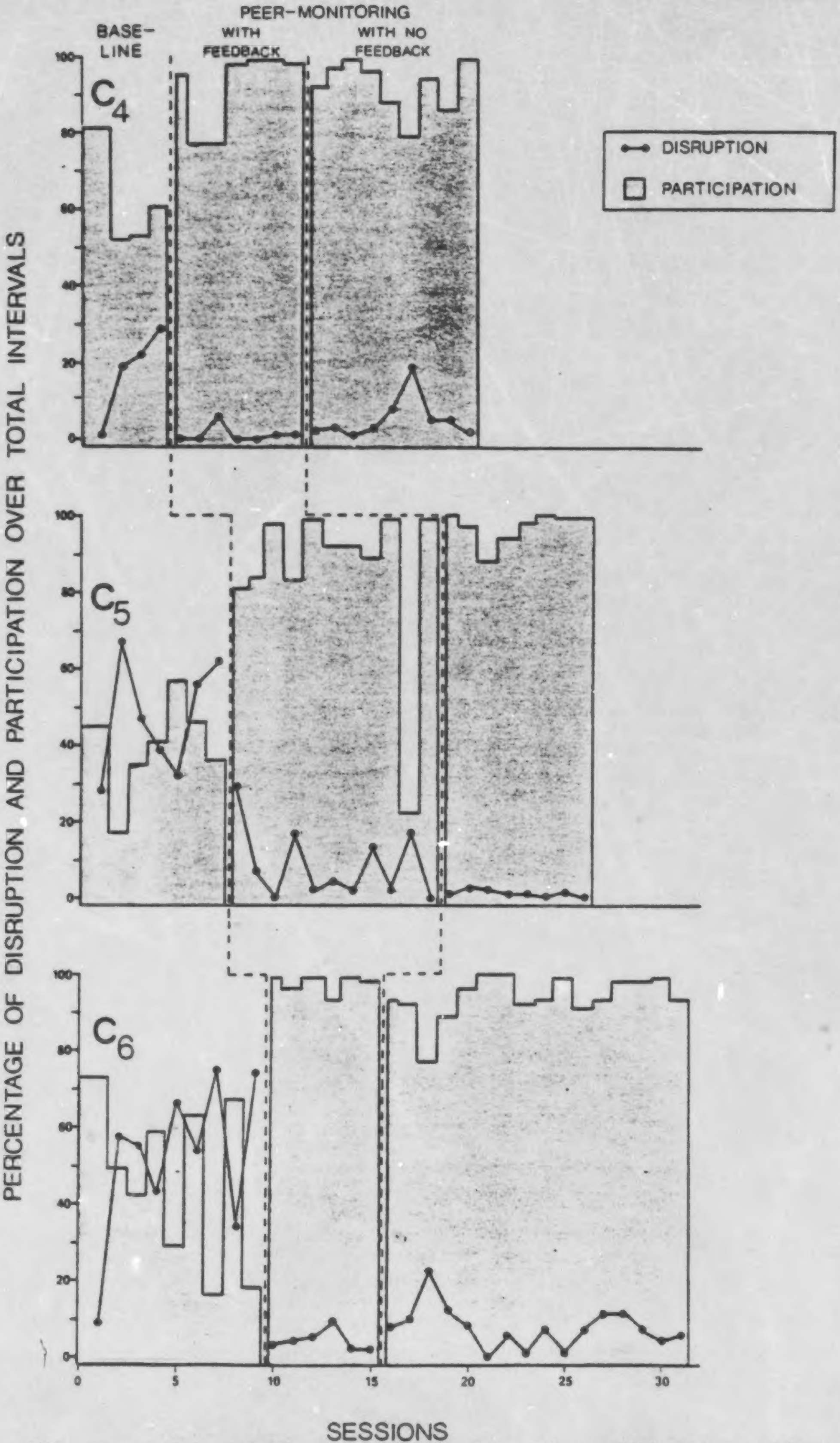


Figure 33. Percentage of disruptive behavior and participation exhibited by the three most troublesome children in Experiment II.

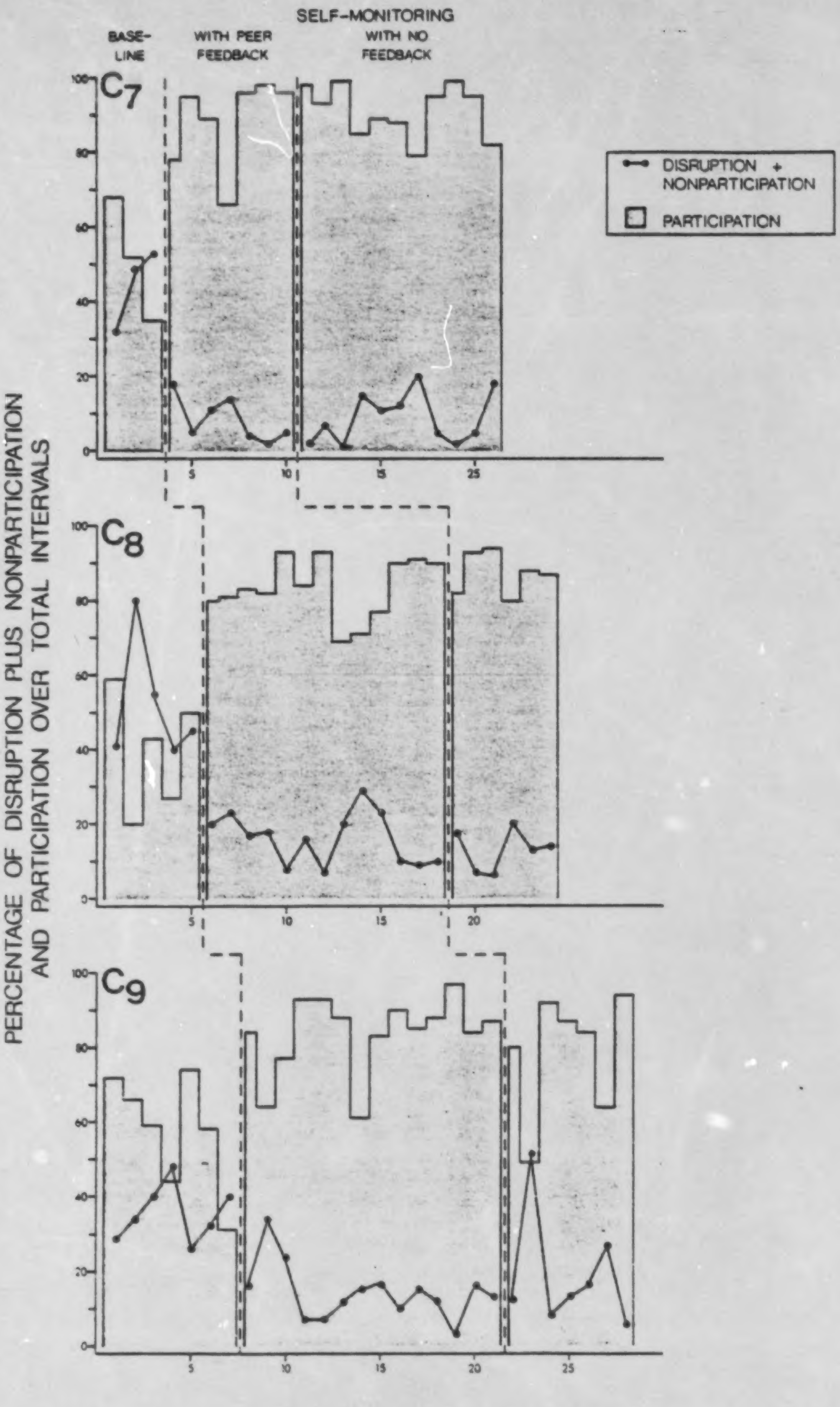


Figure 34. Percentage of disruptive behavior and participation exhibited by the three most troublesome children in Experiment III.

Results. High rates of inappropriate behavior (e.g., 40-100%) were reduced to acceptable levels (e.g., 0-20%). Data from four sample children are shown in Figures 35 and 36.

Discussion. These data indicate that a self-monitoring procedure may be an effective strategy for controlling inappropriate behavior in a preacademic group. The self-monitoring procedure seems equally successful in individual and group instructional formats.

Recommendations. Future research should examine whether appropriate behavior can be maintained with less obtrusive self-monitoring procedures.

### 18c: "Read Me A Story, Mom": Using Story Time to Remediate Academic Deficits
(PIs: Wedel and Fowler)

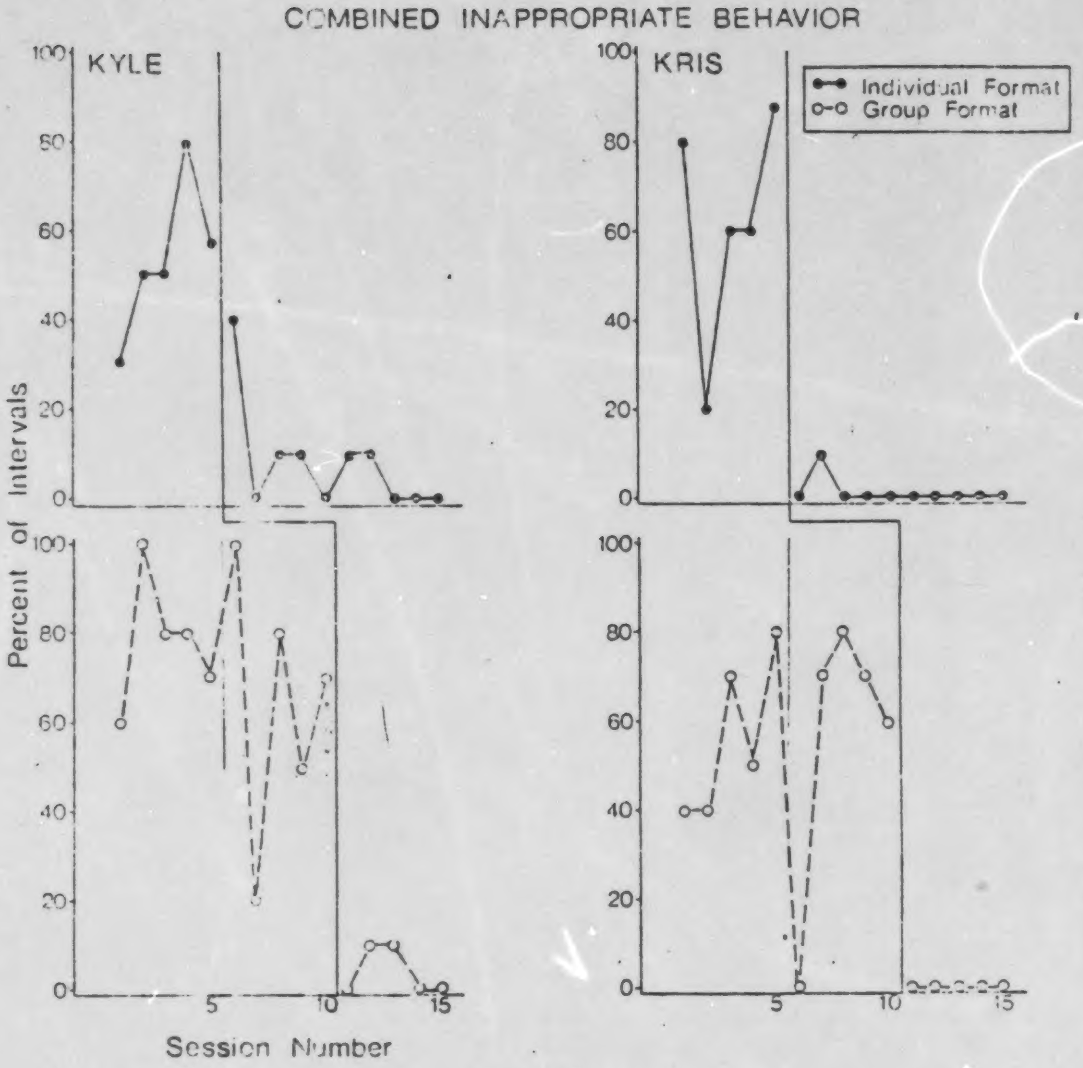
Purpose. Kindergarten teachers often comment that parent involvement in a child's education is a prime factor in school success. Parents, however, sometimes are hesitant to work on academic skills at home. Finding the time and appropriate materials can be obstacles. Parents who read stories to their children could use this time and the story books as a convenient vehicle for tutoring, however. Thus, the purpose of this study was to develop a simple but systematic home-tutoring procedure for use by parents during story time.

Subjects/Setting. Four mother-child dyads participated. Two children, Howard and Kim, both aged six, were referred from a remedial kindergarten. The other two children, Edith and Bert, aged four, were referred from a preschool for children with speech or language delays. The intervention was conducted in each child's home. Data on the effects of the story time intervention were collected during probe tests conducted in each child's classroom.

Data Collection. Two types of data were collected. Pretest and probe test results on letter and word identification were obtained each week at school. Audio tapes of the parent-child story time recorded in the home were scored for number of word and letter identification training trials and for the number of minutes the parents spent reading stories.

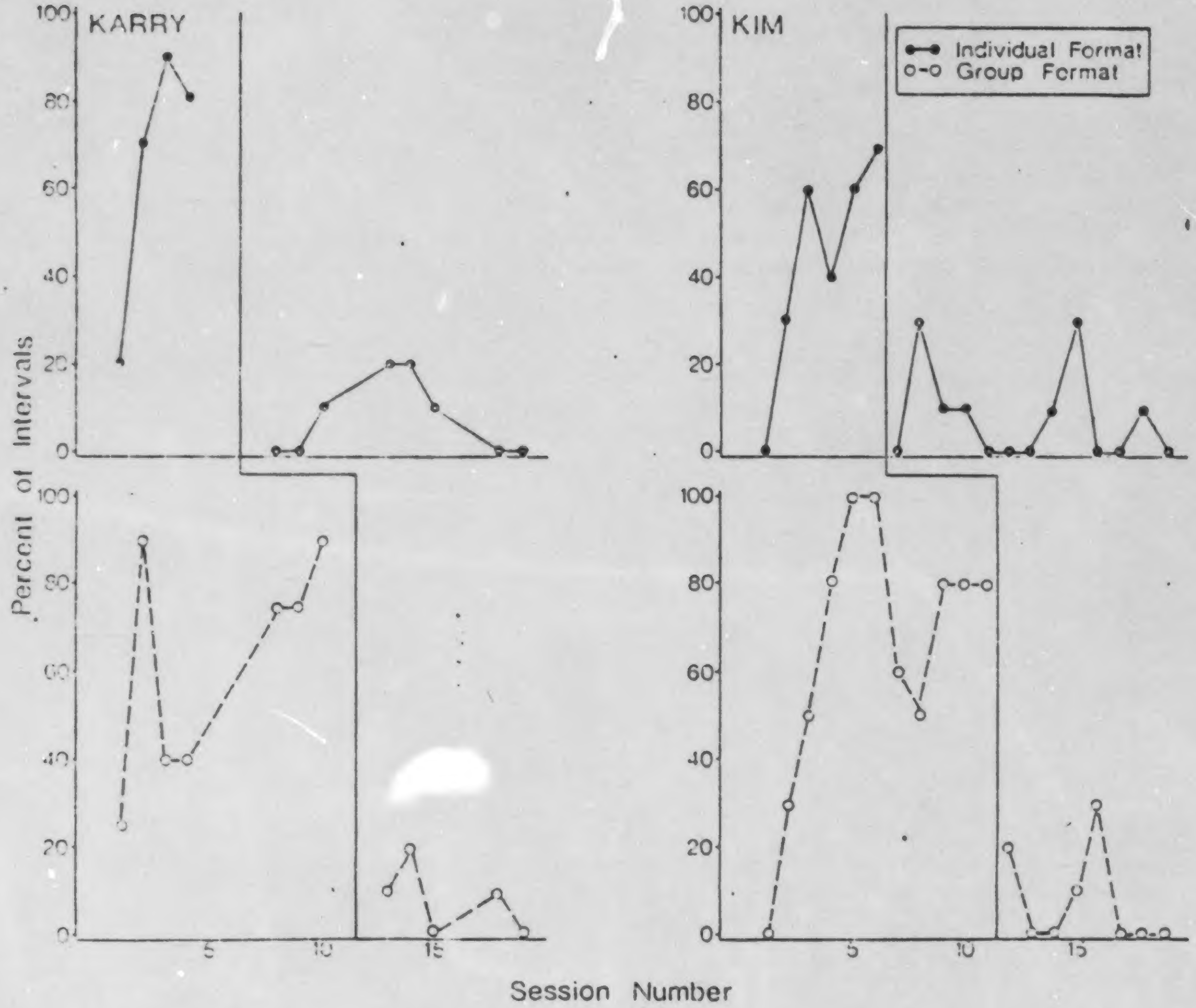
Experimental Design. A multiple baseline across sets of training letters or words was employed with each parent-child dyad.

Procedures. The experimenter met individually with each mother and described the reading program. The mother agreed to read and tape-record four stories per week and the experimenter agreed to supply the necessary materials (e.g., books, tapes). After the parents had read to their children for several weeks without any particular target skills, they were asked to begin training specific letters or words. Training items were chosen that had not yet been acquired, but that would be highly functional in the child's next school placement. Sets of letters or words were trained in multiple-baseline fashion.



COMBINED INAPPROPRIATE BEHAVIOR
KYLE
KRIS
Individual Format
Group Format
Percent of Intervals
Session Number
0
20
40
60
80
100
5
10
15

FIGURE 35



COMBINED INAPPROPRIATE BEHAVIOR

FIGURE 36

Kim and Bert worked on three new sight words at a time. When the first three were acquired, a second set was trained, and so on. Howard learned to name four lower-case letters per set, and Edith worked on two letters per set.

Results. The two children who received training on sight words acquired each set of words within two weeks following onset of training for each set. Kim learned a total of 26 words and Bert learned a total of 18 words (see Figures 37 & 38). Both children maintained all words at a 100% level in posttests conducted several weeks after training. Howard, one of the children studying letters, acquired 12 words and maintained them at 100% during a posttest, again several weeks after training (see Figure 39). The fourth child, Edith, received training on six letters but failed to maintain the letters at a 100% level during training (see Figure 40).

Figure 41 presents the average number of trials per story reading for Kim and Howard and the average number of minutes spent each evening on story-reading by Kim and Howard. Kim and her mother spent 10 to 30 minutes reading each day. Her number of trials per session varied considerably, ranging from 7 to 61, with a total average of 20 trials per day. Howard's sessions ranged from 4 to 11 minutes; the number of trials per session averaged 19 and ranged from 5 to 31.

Discussion. The results of these interventions indicate that parents can teach their children a significant amount of educational material at home with minimal instruction. The setting for this tutoring was a comfortable story-reading situation with its inherent reinforcing properties for both parent and child. The parents adapted the basic instructional procedures into a teaching style that was unique and effective for their child.

The parents indicated a high level of satisfaction with the procedure by their positive responses on a satisfaction questionnaire and by their continued participation in the procedure even after the program formally ended. Howard's mother continued to teach words recommended by the first grade teacher and Kim's mother began devising her own list of words.

Recommendations. The same technique might also be applied to other targets such as teaching specific vocabulary, color identification, shape recognition, counting, numeral identification, etc. Parents of preschoolers looking for a way to work with their bright young children also might be attracted to this technique.

A second major area of research might be a component analysis of this program. Would the program be a successful teaching technique if the parents did not tape-record their sessions? If this program were packaged, could a kindergarten teacher administer it without an extensive outlay of time and energy?

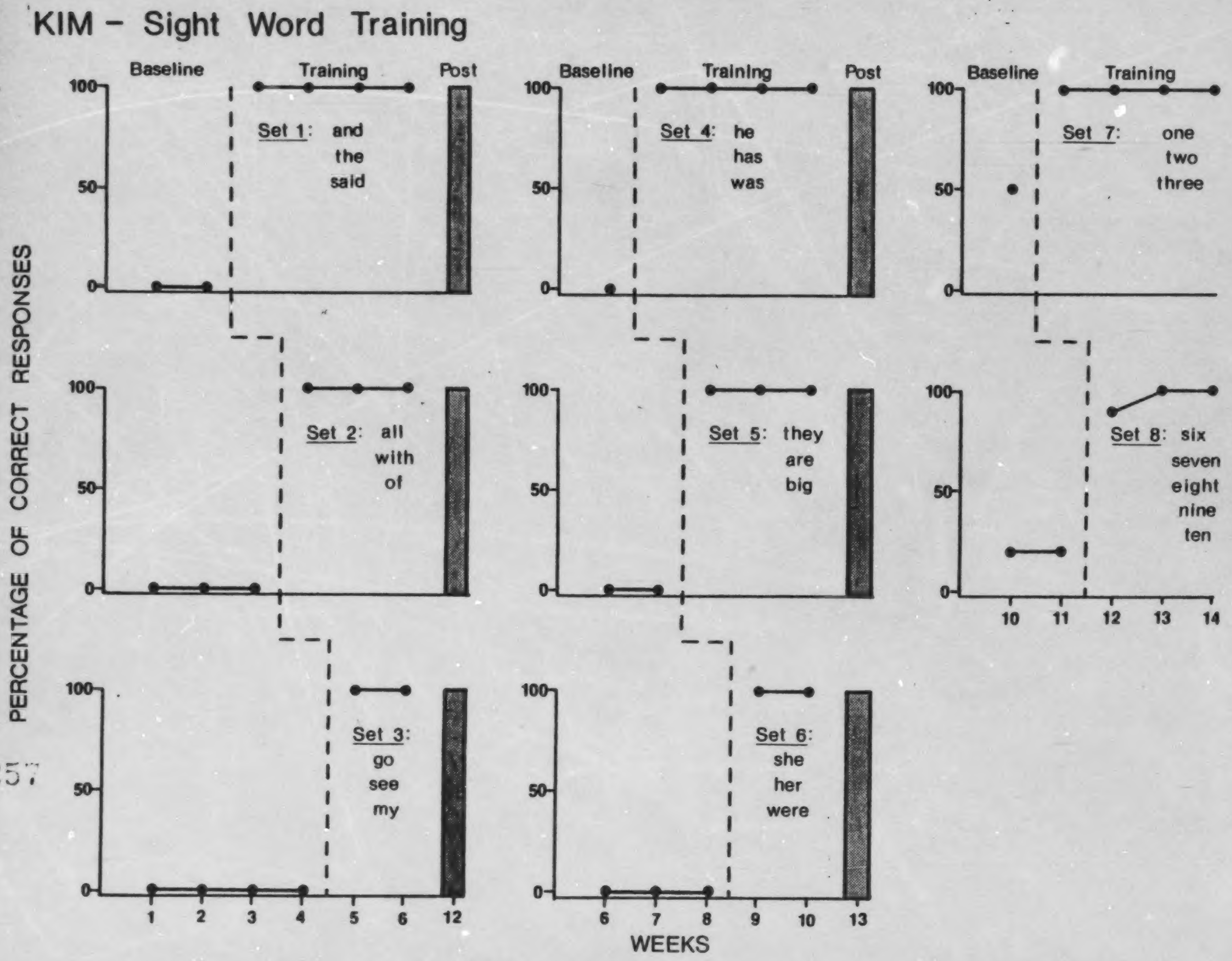

KIM - Sight Word Training
PERCENTAGE OF CORRECT RESPONSES
Baseline
Training
Post
100
50
0
Set 1: and the said
Set 2: all with of
Set 3: go see my
Set 4: he has was
Set 5: they are big
Set 6: she her were
Set 7: one two three
Set 8: six seven eight nine ten
1
2
3
4
5
6
12
6
7
8
9
10
13
10
11
12
13
14
WEEKS

Figure 37

BERT - Sight Word Training

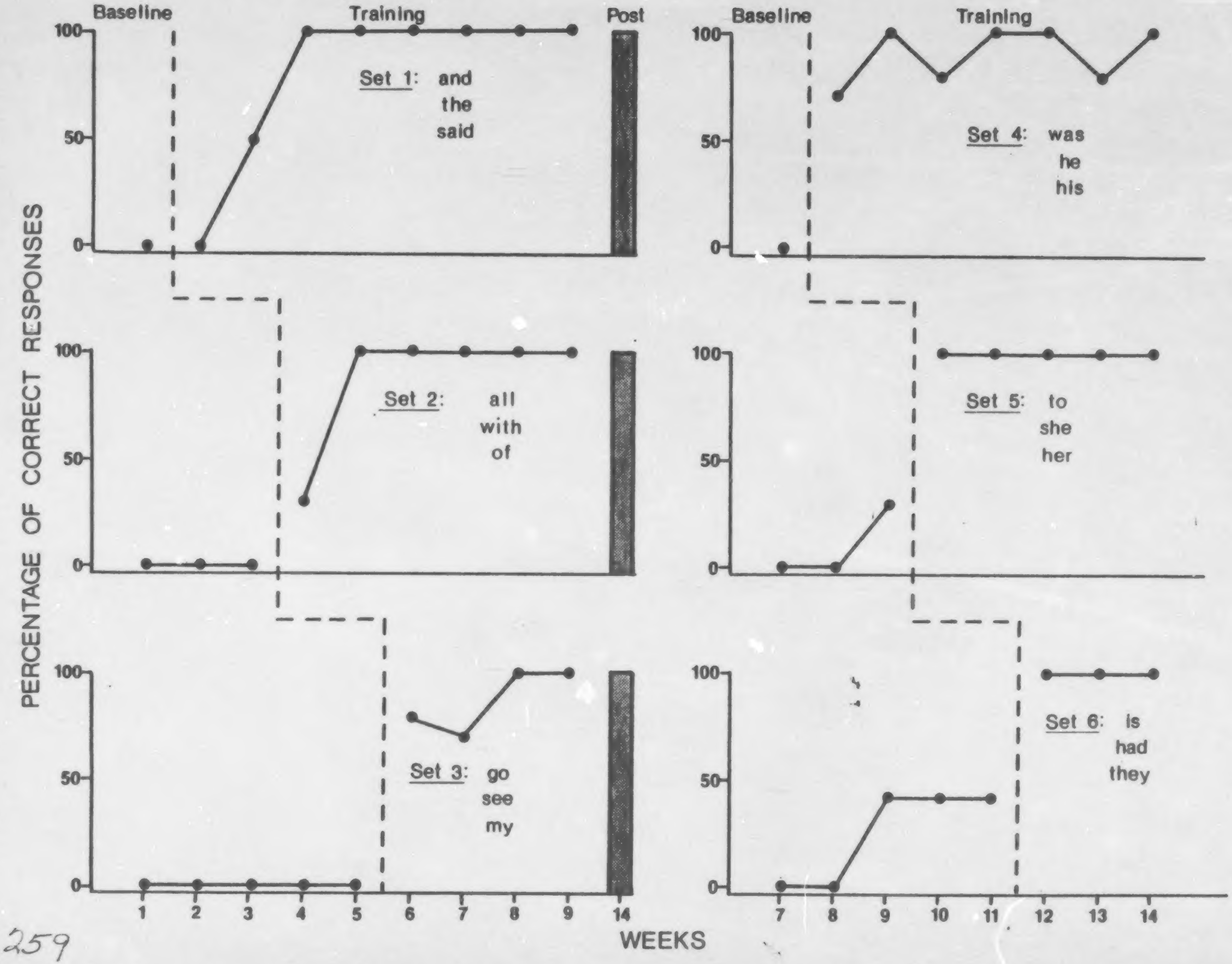


Figure 38

HOWARD - Letter Identification Training

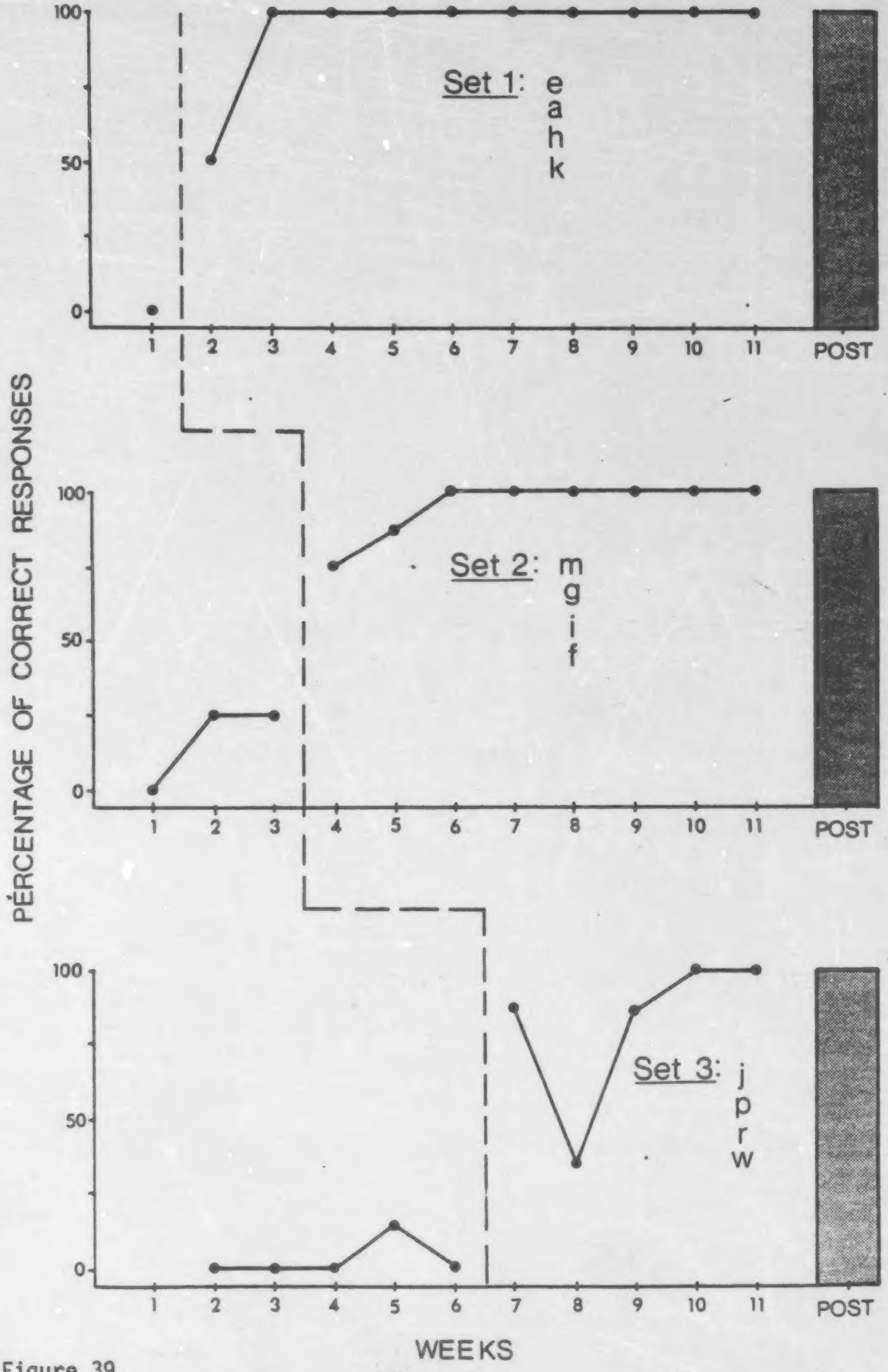


Figure 39

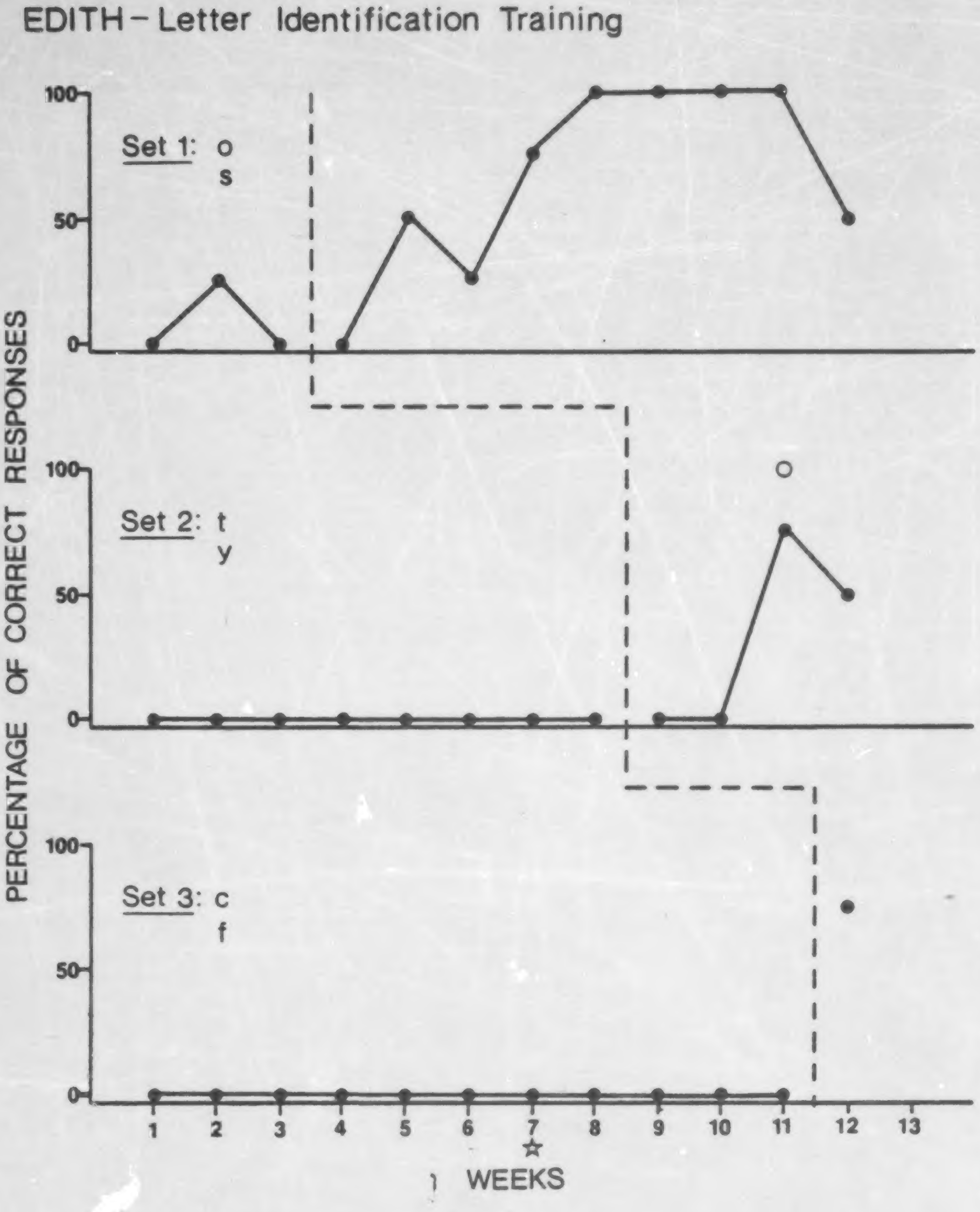

EDITH - Letter Identification Training
PERCENTAGE OF CORRECT RESPONSES
Set 1: o s
Set 2: t y
Set 3: c f
100
50
0
1
2
3
4
5
6
7
8
9
10
11
12
13
☆
WEEKS
☆ reinforced probes started
○ self corrected

Figure 40

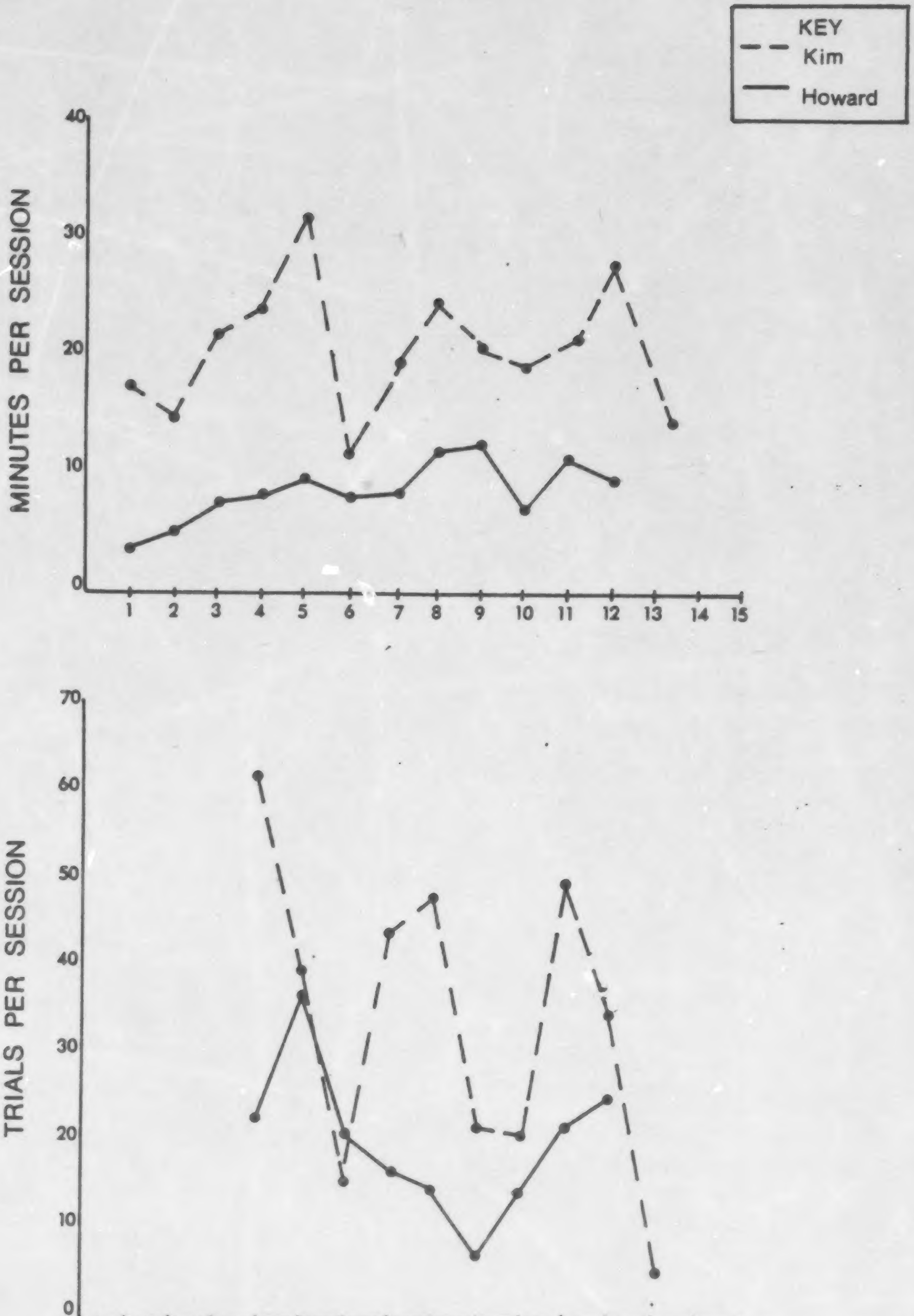

KEY
Kim
Howard
MINUTES PER SESSION
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
TRIALS PER SESSION
70
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
WEEKS

Figure 41

## 18d: RECESS Revisited: Using Peer Monitors to Decrease Negative and Aggressive Behavior on a School Playground

(PIs: Dougherty, Fowler, and Paine)

Purpose. High rates of negative and aggressive behavior on the school playground can cause a child to lose friends, to be unable to make new friends, and generally to be rejected by other children in a variety of school settings. This problem needs to be addressed, but due to the large student/staff ratio which usually prevails on school playgrounds, school personnel are typically unable to teach appropriate social behavior in this setting--or even to monitor it closely. Other (nonnegative) children seem to be a logical and readily available resource which could be drawn upon to help monitor and teach appropriate social behaviors in this setting. Thus, the purpose of this study was to determine the effects of involving nonnegative peers as peer-monitors for two negative/aggressive educable mentally handicapped (EMH) students on a public school playground.

Subjects/Setting. Two nine-year-old boys, diagnosed as mildly retarded, were the subjects of intervention. Five children (4 boys and 1 girl), also diagnosed as mildly retarded and ranging in age from 8.6 to 9.10, served as peer monitors. All observations and interventions took place on the school playground adjacent to the school these children attended. Observations were condcuted in the three recess periods: morning, noon, and afternoon.

Data Collection. Four measurement systems were used in this study: a 5-second interval observation code; a sociometric rating scale completed by the subjects' classmates; a social behavior rating scale completed by the teachers; and a consumer satisfaction rating scale, completed by the peer-monitors. The observation code measured the following subject and peer-monitor behaviors: negative interactions with peers, negative interactions from peers, positive interactions with peers, and rule infractions. In addition, praise and reprimands from peer-monitors and adults were coded.

Experimental Design. A multiple baseline design across recess periods was employed with both subjects. Intervention was introduced in successive fashion for $C_1$ first during morning recess, then during afternoon recess, and last during the noon hour. Intervention was implemented for $C_2$ first at noon and then in the afternoon.

Procedures.

Experiment I. Interventions conducted with $C_1$ comprised the first experiment. Following an initial baseline phase, a standardized, recess-based point system was implemented on the playground by a school consultant during morning recess. This intervention, which consisted of an adaptation of the RECESS Program developed at the University of Oregon, included discrimination training behavior on the playground, loss of points for negative/aggressive behavior, group rewards in the classroom for meeting daily point criteria, and a home-based reinforcement component. When $C_1$'s negative/aggressive behavior appeared to be well under the control of the consultant-implemented procedures, five of $C_1$'s classmates were trained to implement a simplified version of the playground intervention in the morning recess. Once $C_1$'s behavior had restabilized, the peers were instructed to implement the procedures in the afternoon recess.

Subsequently, $C_1$ was trained to act as peer monitor in the noon recess. He was appointed to monitor the second subject, $C_2$.

Experiment II. $C_2$'s intervention was similar to $C_1$'s intervention. After an initial baseline and consultant-implemented program during the noon recess, $C_2$ was monitored by $C_1$. Following a stable rate of behavior during the noon recess and generalized improvements to the morning recess, $C_2$ was appointed to act as a peer-monitor for a third child during the afternoon recess.

Results.

1. The intervention was effective in reducing $C_1$ and $C_2$'s rates of negative interaction when implemented by a consultant, a peer-monitor, or by the target subjects themselves. (See Figures 42 and 43.)

2. Intervention into all three settings was needed to reduce $C_1$'s rate of negative interactions in each setting. No generalization across settings was noted. Generalization to a second, but not a third setting was noted with $C_2$ following intervention into his first setting.

3. The five children appointed as peer-monitors for $C_1$ also demonstrated changes in behavior. Their already low rates of negative behavior were eliminated in the morning and afternoon settings in which they monitored. A generalized elimination of negative behaviors also was noted from the days in which they were appointed as peer-monitors to days in which they were not appointed. In addition, several of the children generalized decreases in their low rate of negatives to the noon recess, a setting in which they never intervened. (See Figures 44, 45, 46, 47, and 48.)

Discussion. The program examined in this study provided a cost-effective set of procedures for decreasing children's negative behaviors toward peers and for improving their social interactions on the playground. The system initially required an extensive amount of adult time and input to monitor the target children's behavior. However, once the peer-monitored interventions were in effect, the amount of adult monitoring was greatly reduced, without loss of program effectiveness. Furthermore, the use of peers to monitor classmates on the playground may have beneficial effects on the behavior of peers who serve as monitors as well as on the children being monitored.

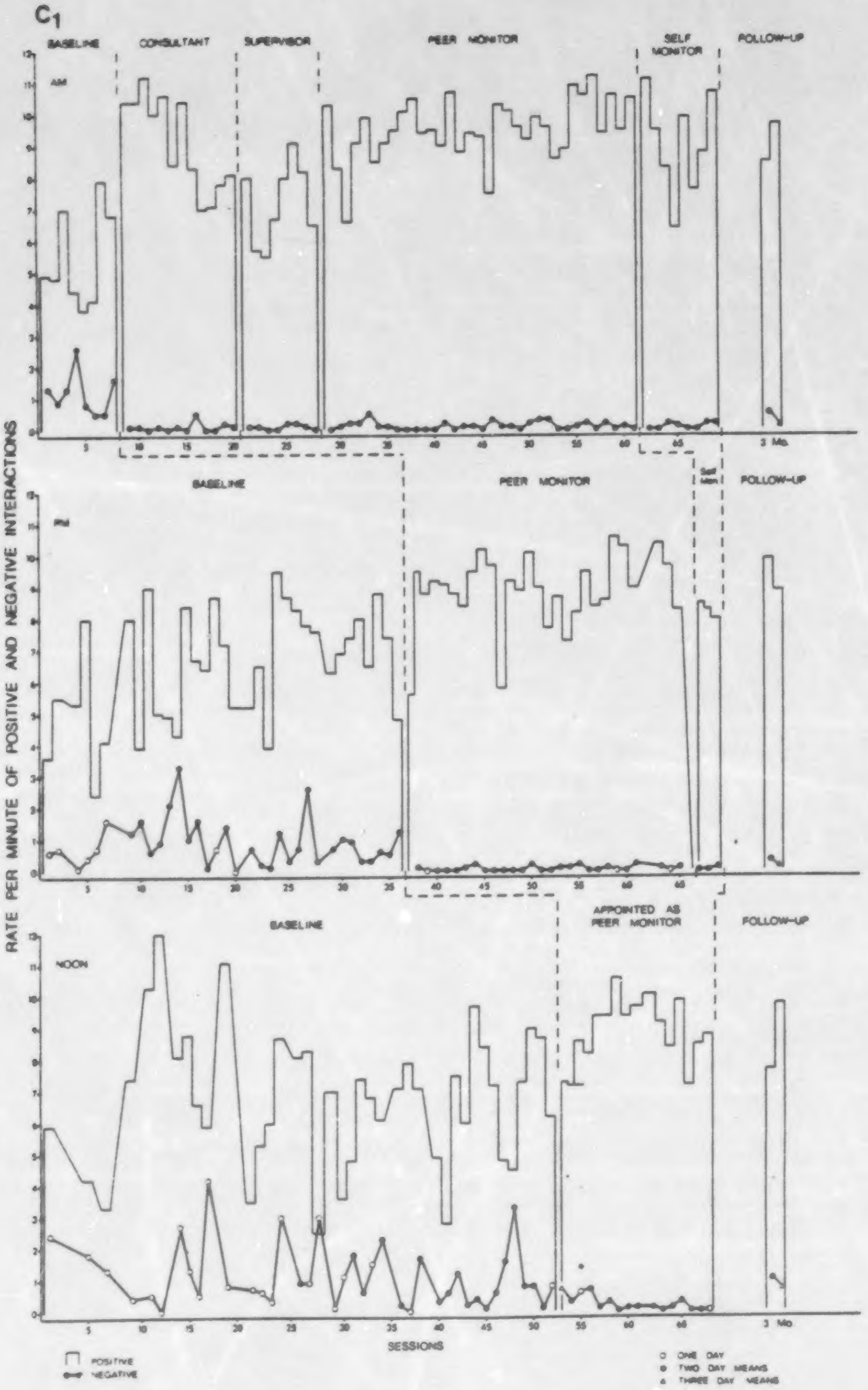


Figure 42. Rate per minute of positive and negative interactions exhibited by $C_1$.

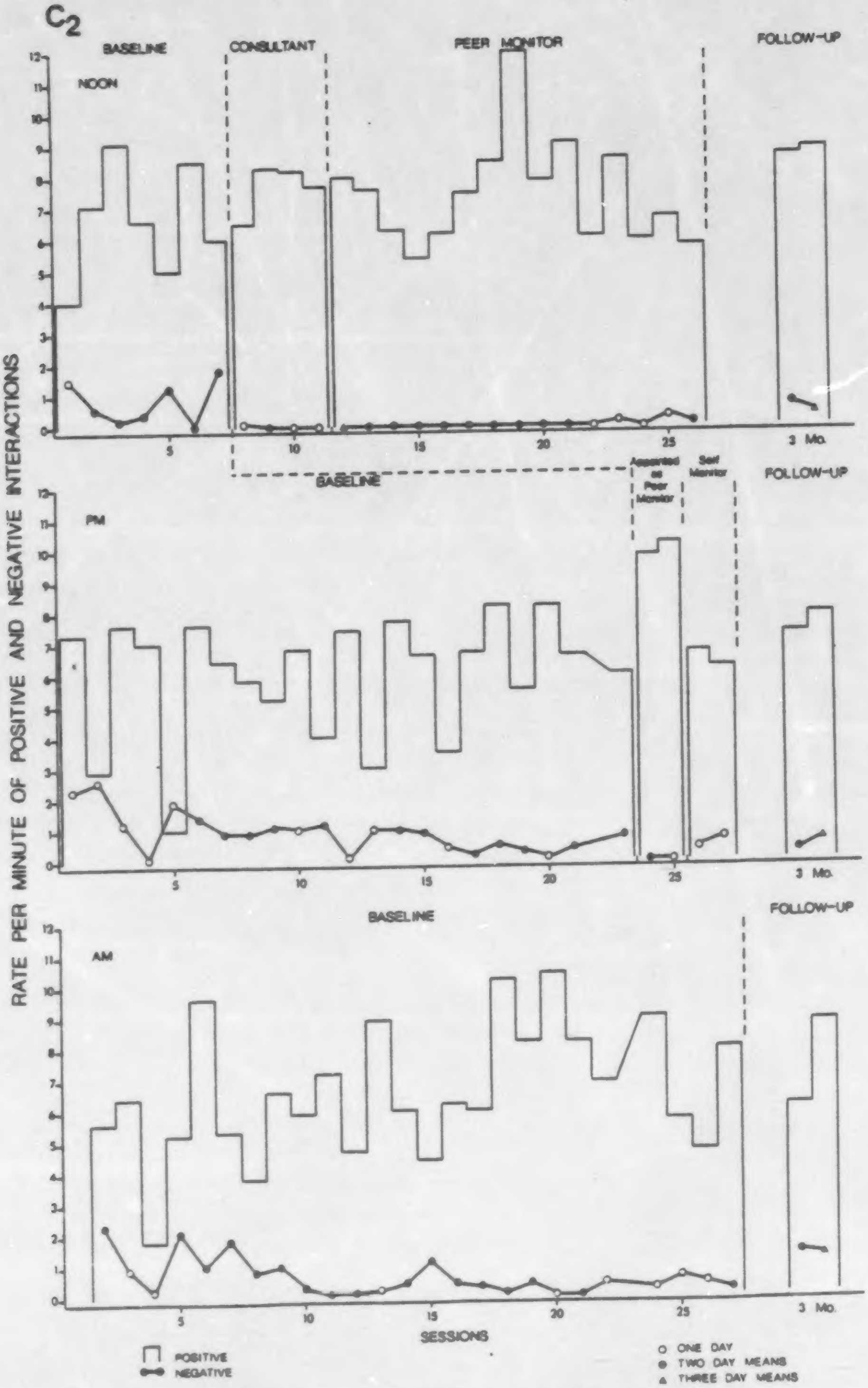


Figure 43. Rate per minute of positive and negative interactions exhibited by $C_2$.

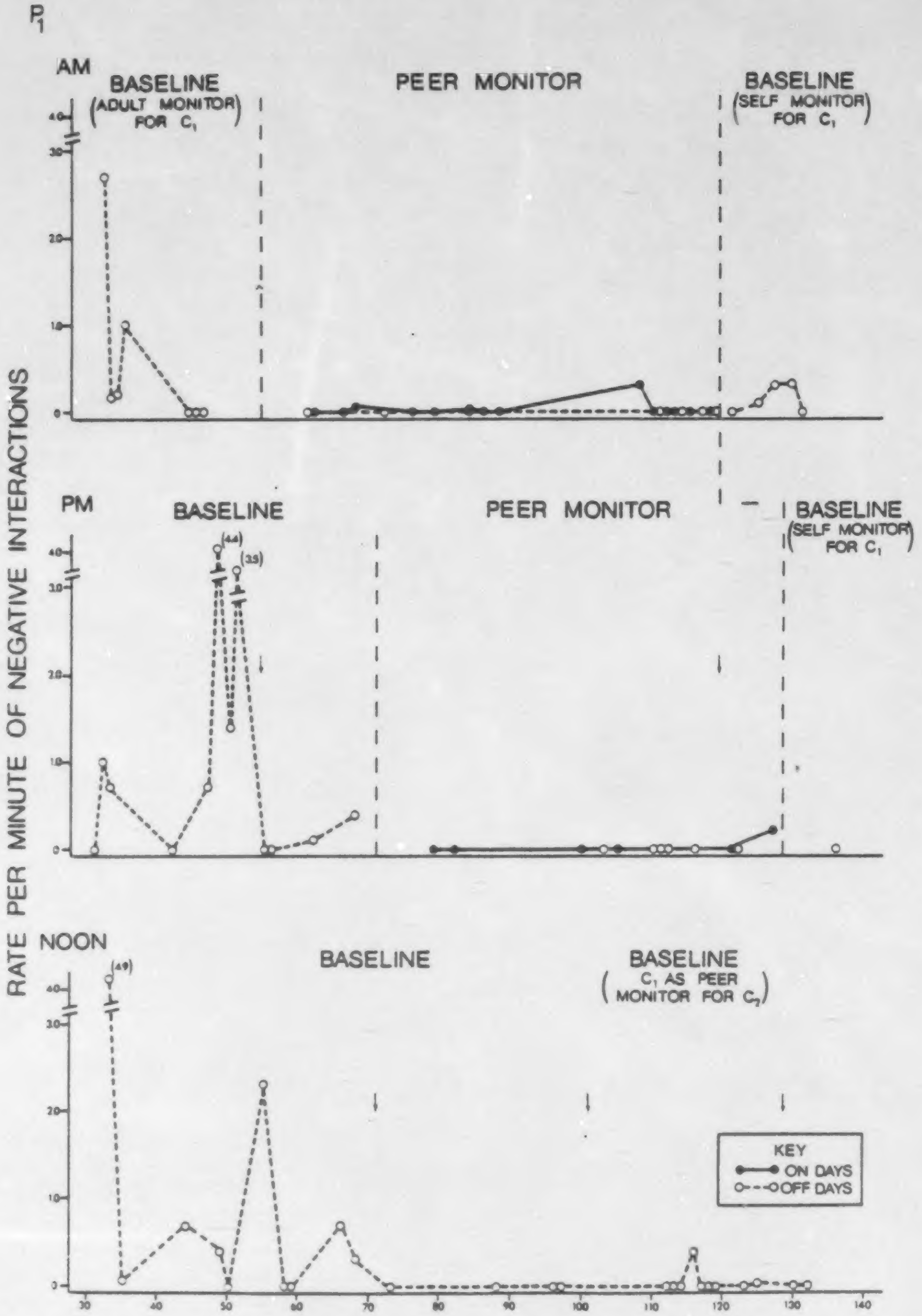


Figure 44. Rate per minute of negative interactions exhibited by $P_1$.

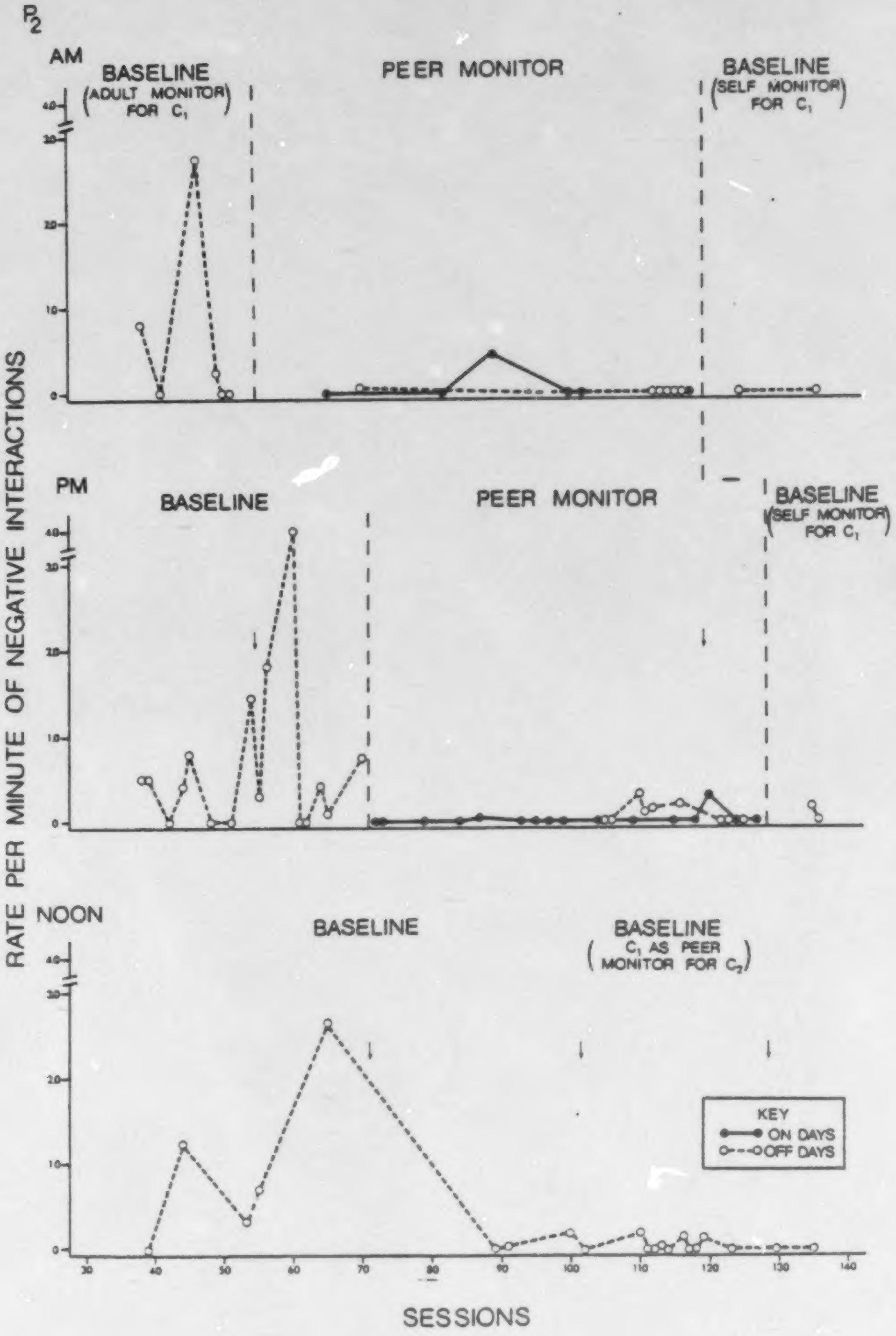


Figure 43. Rate per minute of negative interactions exhibited by $P_2$.

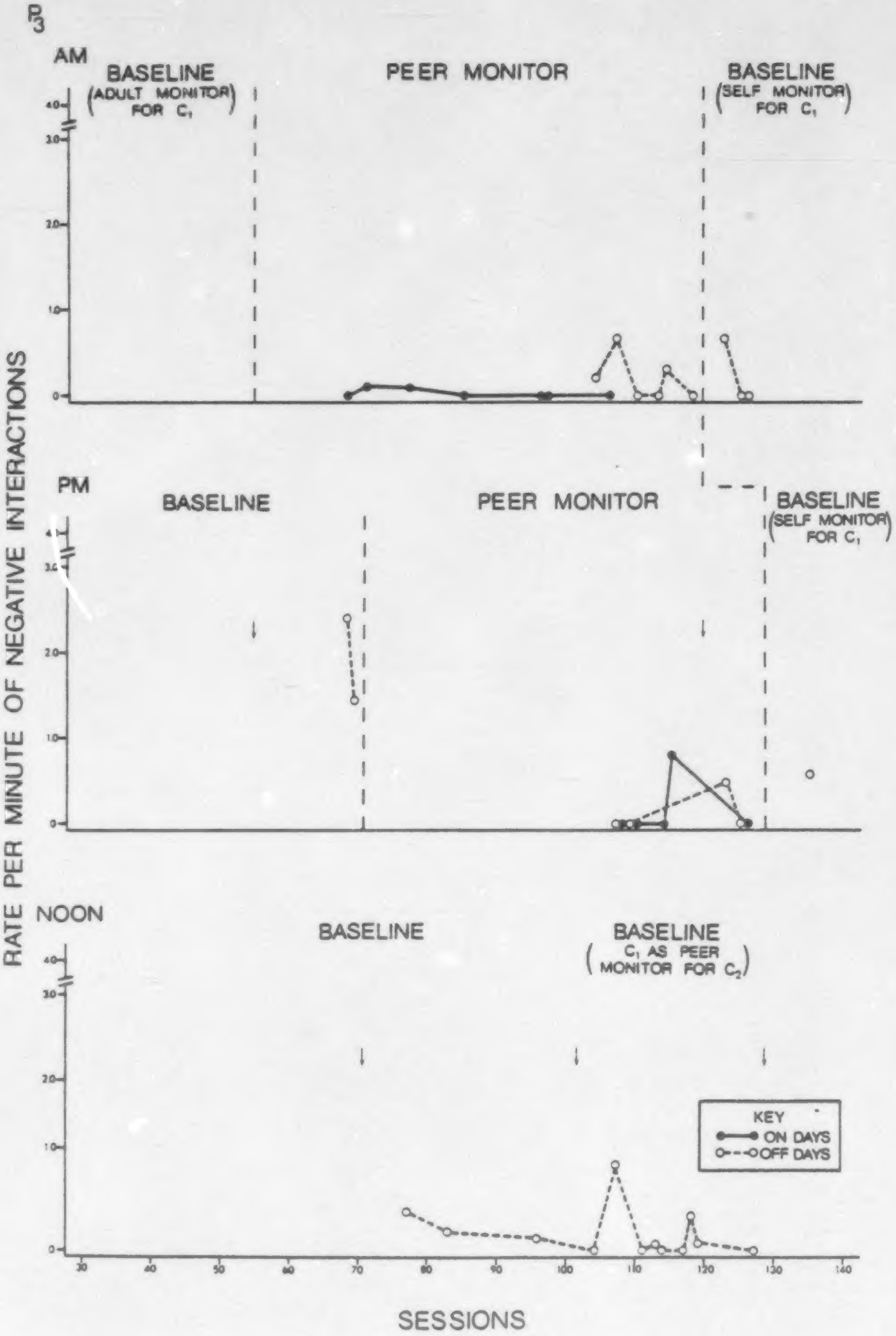


Figure 46. Rate per minute of negative interactions exhibited by $P_3$.

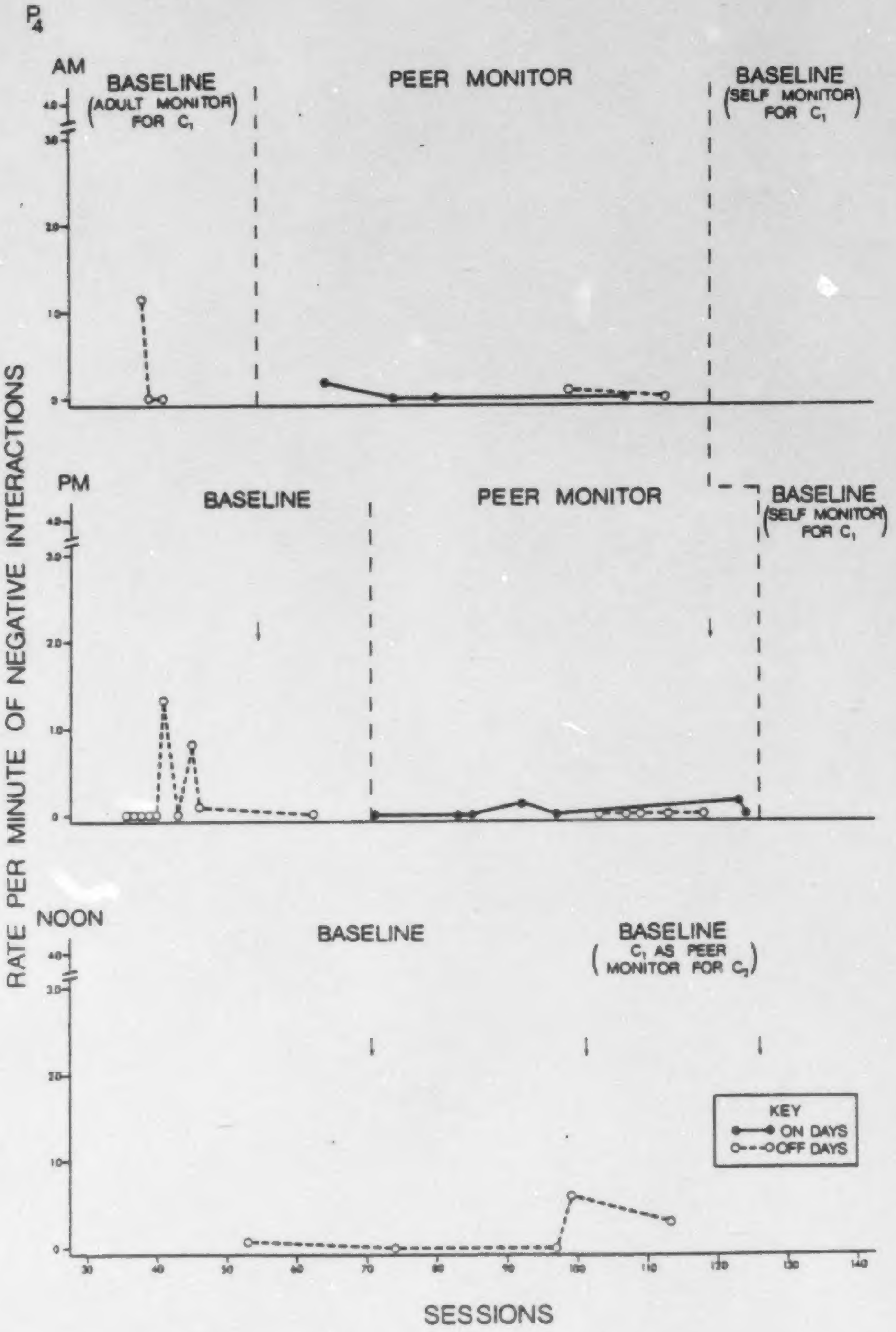


Figure 47. Rate per minute of negative interactions exhibited by $P_4$.

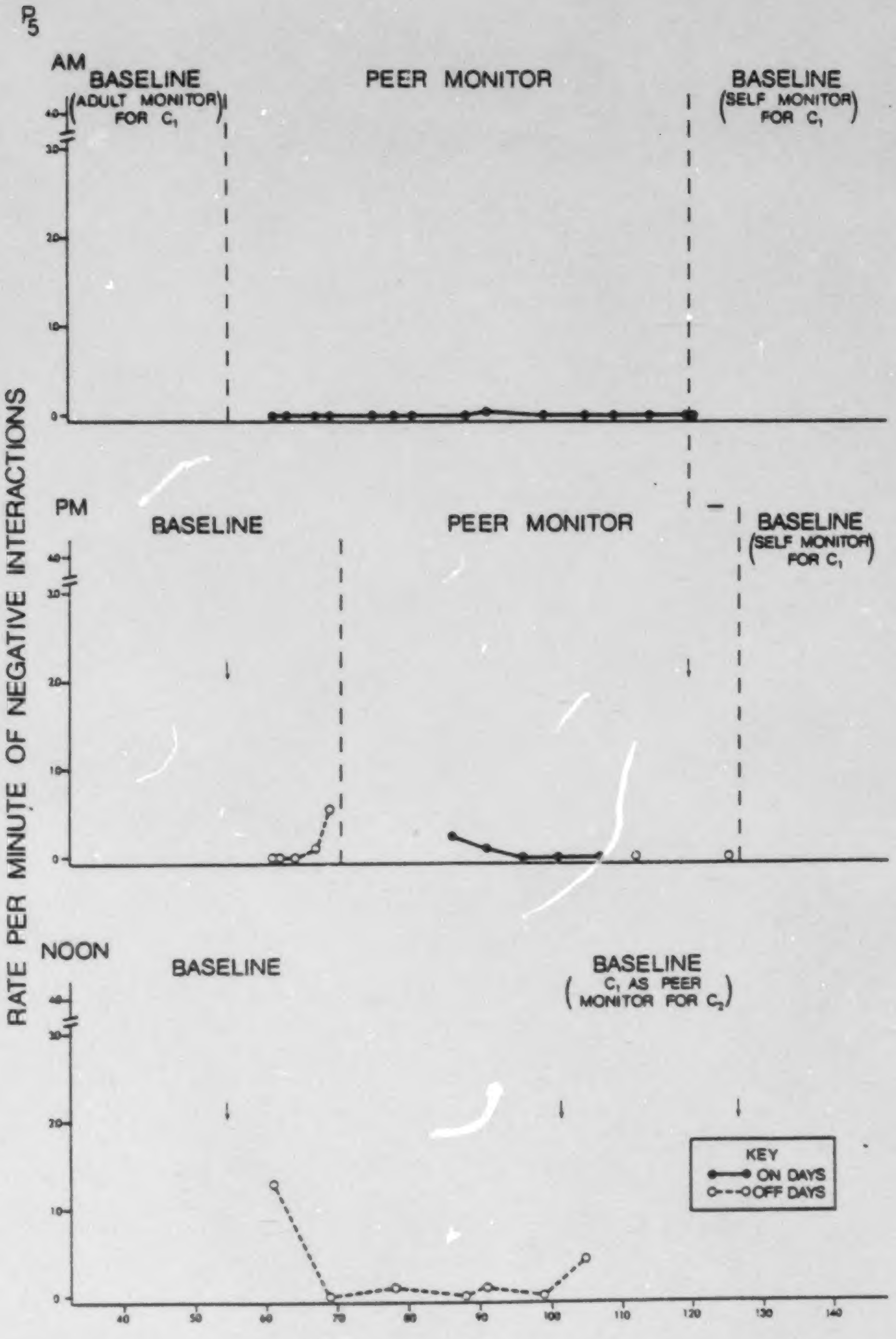


Figure 48. Rate per minute of negative interactions exhibited by $P_5$.

### 18e: Role Reversals: Appointing Deviant Children to Monitor Model Classmates
(PIs: Fowler, Dougherty, Kirby, and Baer)

Purpose. This study was conducted to determine if appointment of a problem child as a peer-monitor would improve the problem child's behavior.

Subjects/Setting. Three first-grade boys who exhibited high rates of aggressive and negative interactions served as subjects. The study was conducted on a grade school playground during the three daily recess periods.

Data Collection. Data were collected, using a 5-second interval code, on the following behaviors of the subjects: negative interaction, positive interaction, rule infractions, negative behavior from peers, monitor prompts and praise, teacher prompts and praise.

Experimental Design. A withdrawal of treatment or ABAB design was used.

Procedures. Following baseline, three children were appointed as peer-monitors. They were instructed to monitor a socially competent peer during the noon recess. Monitoring entailed observing the child, awarding a maximum of four bonus points for good behavior, and withdrawing a maximum of two points for inappropriate behavior. If the monitored child earned a sufficient number of points, the peer monitor and the child who was monitored could participate in a small group reward (e.g., card game). Two other recesses were examined to determine if improvements in the peer-monitor's performance generalized from the intervention recess.

Results. Appointment as a peer monitor produced an immediate and dramatic decrease in the three subjects' undesirable behavior on the playground. These changes later reversed when appointments were discontinued during the reversal phase of an ABAB design (see Tables 8 , 9 , and 10). Results also suggest that transitory generalization occurred in the morning recess following each implementation of the peer monitoring condition, but did not maintain.

Discussion. Results suggest that children with behavior problems may assume the role of intervention agent and that reinforcement for appropriate participation in this role may reduce their undesirable behavior. This role reversal may reduce the stigma sometimes associated with being the target of intervention and may make the child a more active agent in his own behavior change. Furthermore, appointment as a peer-monitor may focus the child's attention on examples of socially desirable behavior exhibited by his peers.

Recommendations. Procedures to facilitate generalized improvement of behavior from the intervention recess to other recesses should be developed. Delayed reinforcement (cf., Fowler & Baer, 1981) holds promise as a procedure likely to enhance generalization of the effects produced in this study.

## Table 8

## Rate per Minute of Negative and Aggressive Interactions by $C_1$

| Peer Monitor$_1$ | | Baseline (29-37) | Peer Monitor (38-49) | Baseline (50-70) | Peer Monitor (71-82) |
|---|---|---|---|---|---|
| NOON Recess | $\overline{X}$ | $\frac{8.71}{8} = 1.09$ | $\frac{1.4}{9} = .16$ | $\frac{14.82}{20} = .74$ | $\frac{1.58}{12} = .13$ |
| (Intervention) | range | .39 2.1 | 0 .5 | .08 2.01 | 0 .83 |
| AM Recess | $\overline{X}$ | $\frac{3.16}{4} = .79$ | $\frac{2.25}{9} = .25$ | $\frac{5.64}{11} = .51$ | $\frac{3.96}{10} = .39$ |
| (Generalization) | range | .5 1.45 | 0 .3 | .07 2.17 | 0 1.47 |
| PM Recess | $\overline{X}$ | $\frac{1.55}{4} = .39$ | $\frac{2.49}{6} = .42$ | $\frac{7.86}{12} = .66$ | $\frac{6.15}{9} = .68$ |
| (Generalization) | range | .09 .73 | 0 .85 | 0 2.0 | .08 2.18 |

## Table 9

Rate per Minute of Negative and Aggressive Interactions by $C_2$

| Peer Monitor$_2$ | | Baseline (1-31) | | Peer Monitor (32-49) | | Baseline (50-66) | | Peer Monitor (67-79) | |
|---|---|---|---|---|---|---|---|---|---|
| NOON Recess | $\overline{X}$ | $\frac{28}{26}$ = | 1.08 | $\frac{2.54}{17}$ = | .15 | $\frac{8.32}{17}$ = | .49 | $\frac{2.94}{12}$ = | .25 |
| (Intervention) | range | .14 | 1.8 | 0 | .5 | .13 | 1.59 | 0 | .48 |
| AM Recess | $\overline{X}$ | $\frac{15.36}{19}$ = | .81 | $\frac{1.66}{8}$ = | .21 | $\frac{3.58}{8}$ = | .45 | $\frac{7.36}{12}$ = | .61 |
| (Generalization) | range | 0 | 4.05 | 0 | .53 | .08 | 1.75 | 0 | 1.83 |
| PM Recess | $\overline{X}$ | $\frac{5.25}{8}$ = | .66 | $\frac{4.26}{7}$ = | .61 | $\frac{4.4}{13}$ = | .34 | $\frac{4.74}{9}$ = | .53 |
| (Generalization) | range | .09 | 2.12 | .28 | 1.18 | .09 | .85 | .08 | 1.69 |

## Table 10

### Rate per Minute of Negative and Aggressive Interactions by $C_3$

| Peer Monitor$_3$ | Baseline (1-29) | Peer Monitor (30-43) | Baseline (44-50) | Peer Monitor (51- |
|---|---|---|---|---|
| NOON Recess<br>(Intervention) | $\bar{X}$ $\frac{16.29}{26}$ = .62<br>range .10 1.70 | $\frac{1.346}{14}$ = .096<br>0 .42 | $\frac{3.28}{7}$ = .46<br>0 .8 | In progress |
| AM Recess<br>(Generalization) | $\bar{X}$ $\frac{6.9}{15}$ = .46<br>range 0 1.7 | $\frac{6.24}{10}$ = .624<br>.07 1.58 | $\frac{.55}{2}$ = .275<br>0 .55 | In progress |
| PM Recess<br>(Generalization) | $\bar{X}$ $\frac{10.38}{18}$ = .57<br>range 0 1.78 | $\frac{2.84}{10}$ = .28<br>.05 .68 | $\frac{.64}{4}$ = .16<br>.05 .35 | In progress |

## QUESTION G: HOW CAN THE DESIGN AND UTILIZATION OF INSTRUCTIONAL MATERIALS FOR THE HANDICAPPED BE IMPROVED?

(Investigators: Rowbury & Baer)

### Statement of the Problem

Most children do well in school, even when teaching methods and materials are only loosely programmed. However, children who are handicapped or at risk for handicapping conditions often have difficulty learning from traditional instruction. For these children, instruction must be highly structured if they are to succeed in school (Engelman, 1969; Paine, 1980).

Most often, attempts to structure the learning situation for handicapped or at-risk children focuses on tightening instructional delivery (e.g., pacing--Carnine, 1976; praising--Hall, Lund, & Jackson, 1968). However, there are other components of academic structure which might be important for facilitating the success of these students but which are often overlooked--those of instructional design and materials utilization (Carnine & Silbert, 1979). Potentially important design variables include: (a) the use of pictures and illustrations in printed material, (b) the use of embedded comprehension questions in children's reading, (c) the use of various type faces (fonts) in printed material, and (d) the use of various response formats in children's written work. Examples of materials utilization variables which might make a difference in children's performance include: (a) inserting children's names in stories they receive, (b) requiring "observing responses" during reading exercises (placing small extraneous symbols on the pages of children's books and requiring the children to touch the symbols as a means of structuring their attention to the book), (c) reinforcing students for attending during story reading, and (d) establishing children's mastery over a task which was previously difficult for them. This research area has focused on the investigation of these and related variables.

### STUDY 19a: WHAT PICTURE/ILLUSTRATION VARIABLES AFFECT THE COMPREHENSION OF STORYBOOK PROSE?

(PI: D. Embry)

Purpose. Previous laboratory research has shown that illustrations associated with relatively short stories facilitated prose comprehension by young, normal children (Lesgold, Levin, Shimron, & Guttman, 1975; Levin, Bender, & Lesgold, 1976; Ruch & Levin, 1977; Guttman, Levin, & Pressley, 1977), a finding that has not been extended to handicapped children, classroom settings, or longer stories. If the findings could be elaborated in systematic replications, the results would have significant implications for language training (Moerk, 1977) and for the promotion of imitation (Whitehurst, 1977). This study was an elaboration involving longer stories, repeated measures, and handicapped and normal children.

Subjects. Six 4-year-old children, two females and four males, were studied.

Four children were of normal intelligence. Two children were genetically at-risk for partial or complete blindness; these two children were Sally and Zak (both pseudonyms). Only Sally evidenced a visual impairment, but her vision was corrected with glasses. She also had "lazy eye." Ken and Mac were both enrolled in a classroom for behaviorally disturbed children, and both evidenced some developmental delays.

Setting. The setting was a small laboratory room equipped with a one-way mirror. An experimenter and child sat on stools facing the one-way mirror. A board, inclined about 30 degrees, rested on top of a table, which was placed in front of the mirror. Observations of the child were conducted from a room on the other side of the one-way mirror.

Materials. Twenty picture books (high ratio of illustrations to text), which were not available in the curriculum lab at the Child Development Laboratories, were selected from the shelves at the public library. Six questions were written about each book: two on direct objects, two on verbs, and two on subjects. One question from each category was randomly assigned to be depicted or not to be depicted in the appropriate illustration. Thus, the illustration showing Eddie kicking the vending machine was redrawn with no Eddie for the nondepicted question: "Who kicked the ice cream machine?" The storybooks ranged from 300 to 600 words in length and were printed in at least three colors. Books with photographs, montages, or rhyme were excluded. The sequence of books was randomly determined. The entire stories, after redrawing, were copied on a Color Xerox and on an IBM black-and-white Xerox-process machine. Illustrations were cut out of the black-and-white copies, which were then bound in identical loose-leaf notebooks. The prose portions of the stories were tape-recorded by a person with a bachelor's degree in performing arts.

Experimental Design. Counter-balanced reversal.

Recording Procedures. Sessions were videotaped, and two observers scored the duration of fidgeting, sitting still, attention to visual stimulus, and look-away on an eight channel Esterline-Angus event pen recorder, which was placed in an adjoining room to limit cueing from relay clicks. The experimenter wrote down verbatim responses to the close-ended questions; the experimenter and observer had two disagreements on the children's responses. The mean reliability (calculated on 2-second intervals) for each behavior was: fidgeting, X = 90%; sitting still, X = 91%; visual attention, X = 91%; and looks away, X = 88%.

Results. Figure 49 displays average percent change in total prose comprehension for each subject. In the case of Sally, Jane, Zak, Ken, and Mac, comprehension was clearly facilitated by illustrations; that is, children acquired comprehension in the illustration condition and that skill was transferred but not lost in the no illustration condition. Olaf showed a somewhat more variable trend, although the trend favored illustrations. Other results revealed that illustrations reliably controlled the fidgeting of the two females. Illustrations also facilitated the long-term aural recognition of the stories for all subjects.

COMPREHENSION OF ALL PARTS OF SPEECH BY CONDITIONS EXPRESSED AS CHANGE IN PERCENT CORRECT

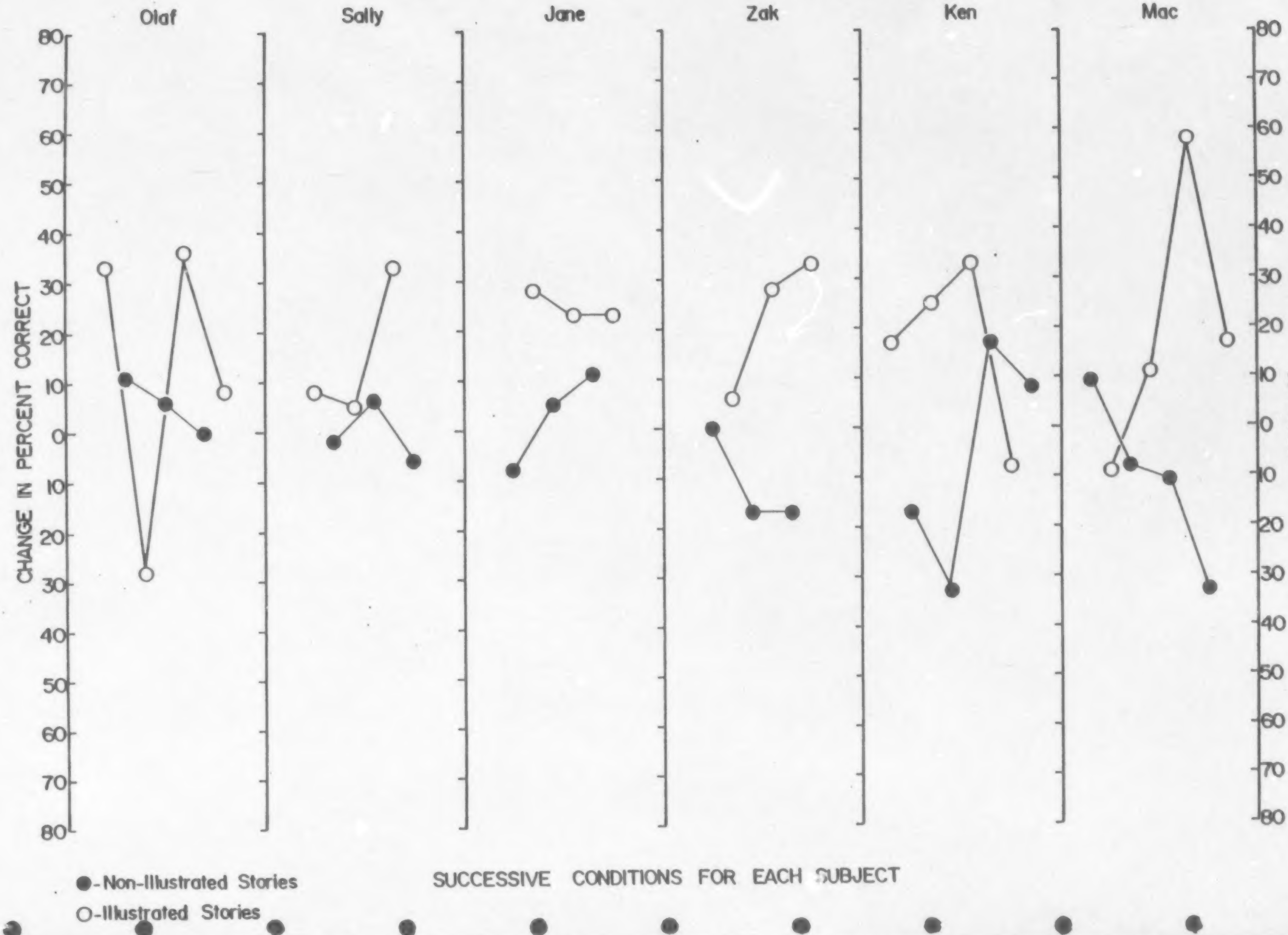


FIGURE 49

Discussion. This study confirms and expands previous laboratory research on the benefits of illustrations on children's prose learning. In addition, this study shows that illustrations simultaneously control children's visual attention and their apporpriate/inappropriate behavior. Finally, this study shows that these effects hold true over repeated measures (more like normal storybook presentations) and for ordinary storybooks (commercially available) with a wide variety of artistic approaches and contents. The fact that prose comprehension of nondepicted items was facilitated in the illustration condition argues that the effect is not mere iconic repetition of the prose. The results of this study appear to indicate the use of illustrated storybooks in facilitating language development of young children.

STUDY 19b: AURAL VARIABLES AFFECTING THE COMPREHENSION OF STORYBOOK PROSE:
USE OF CHILD'S NAME
(PIs: D. Embry)

Purpose. Children's storybooks are both aural and visual in nature. Previous research has indicated that the elimination of the visual element of a storybook causes performance decrements in children's prose comprehension, and the investigators wondered whether the aural element of storybooks could be manipulated to the benefit of children's prose comprehension. Anecdotal observation suggested that using a child's name as the protagonist improved the child's understanding of the storybook content.

Subjects. Four preschool children (two males, two females) were the subjects of study. All of the children were of normal intelligence and enrolled in a daycare center.

Setting. The setting was a small laboratory room equipped with a one-way mirror. An experimenter and child sat on stools facing the one-way mirror. A board, inclined about 30 degrees, rested on top of a table, facing a mirror. Reliability observations were conducted by an observer on the other side of the one-way mirror.

Materials. Sixteen picture books (high ratio of illustrations to text) were selected from the shelves of the public library. The books were not available at the daycare center. Eight questions were written about each book: two questions on subject nouns, two questions on active verbs, two questions on direct objects, and two conditional inference (why) questions. One question from each category (except conditional inferences) was randomly assigned to be depicted or not to be depicted in the appropriate illustration. Thus, the illustration showing Eddie kicking the vending machine was redrawn with no Eddie for the nondepicted subject question: "Who kicked the ice cream machine?" The entire stories were reproduced by color Xerox after redrawing. Subsequently, a woman with professional theater experience recorded several versions of the storybook prose in random order by book: prose with the name of the original protagonist and prose with the name of each of the children as the name of the protagonist (and appropriate pronoun changes).

Experimental Design. Reversal counter balanced across male-female pairs.

Recording Procedures. Each child heard all storybooks, and after hearing

284

a book an experimenter asked the child the eight questions about the book's prose. Answers were recorded. Another observer also recorded answers on reliability checks.

Results. Figures 50, 51, 52, and 53 reveal the results for the four children for the various types of questions. The figures show that using the child's name facilitated comprehension for questions about objects.

Discussion. This study validates the effectiveness of a simple but powerful procedure for improving the comprehension of storybook prose. The results suggest that the computer-generated storybooks ("Me Books") are probably powerful, but one can get the same effect with ordinary books by substituting the child's name.

## STUDY 19c: VISUAL VARIABLES AFFECTING COMPREHENSION OF STORYBOOK PROSE (PI: D. Embry)

Purpose. The previous study on the use of storybook illustrations revealed a positive correlation between fidgeting and children's comprehension of prose. This phenomenon raised the possibility that minimizing fidgeting might facilitate comprehension. At the same time, the investigators noticed that some storybooks have small visual cues imbedded in each illustration that a child is supposed to find; in many cases, the cue is a little bug or creature. The investigators wondered if such a cue would facilitate a child's comprehension. Therefore, this study evaluated the effects of a small dot placed on illustrations that children had to touch each time a page was turned.

Subjects. Four children (two males, two females) were subjects in this study. One female was 6 years old but functioned at a 3-year-old level on a test of receptive language. One male functioned at age level on the same test, but the other two children (one male, one female) performed at the 95 percentile for their age on the test of receptive language. These two subjects are hereafter referred to as "bright."

Setting. Same as the two previously described studies (Studies 19a and 19b).

Materials. The same storybooks used in Study 19b, including the eight types of questions.

Experimental Design. Reversal design counter balanced across male-female pairs.

Experimental Procedures. In successive conditions in which "dots" were used, a small purple dot was drawn on the plastic-page protector over the illustration. The dot was placed against a background on the illustration that allowed the dot to be visible. The dot was erased for sessions in which children received a book without dots.

Results. Across all types of questions, dots helped the comprehension of the two verbally skilled children but minimally helped the less skilled children. These effects were inconsistent across types of questions. Dots

## COMPREHENSION OF ALL-PARTS OF SPEECH BY CONDITIONS EXPRESSED AS PERCENT CORRECT

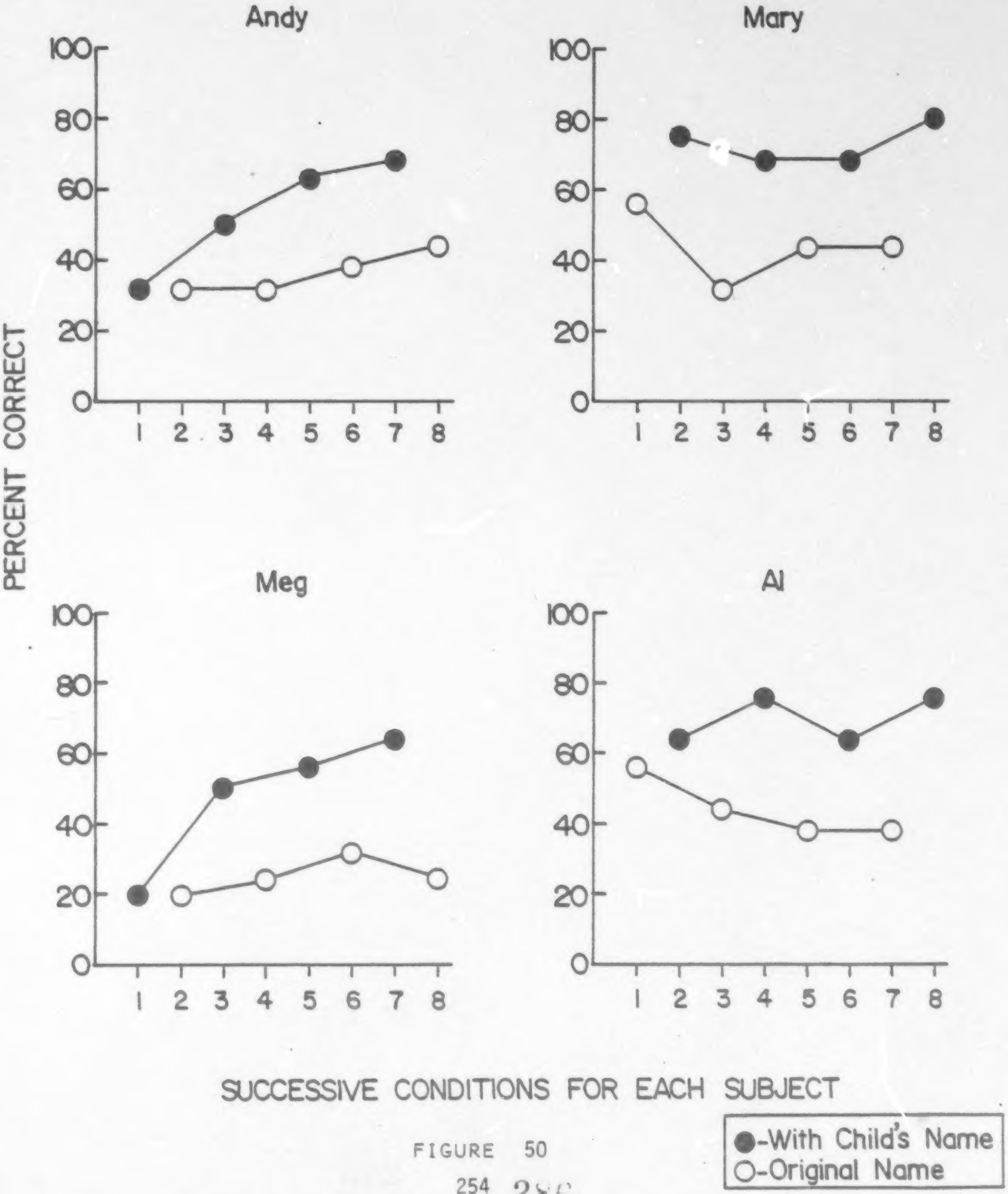


FIGURE 50

COMPREHENSION OF DEPICTED PARTS OF SPEECH BY CONDITIONS EXPRESSED AS PERCENT CORRECT

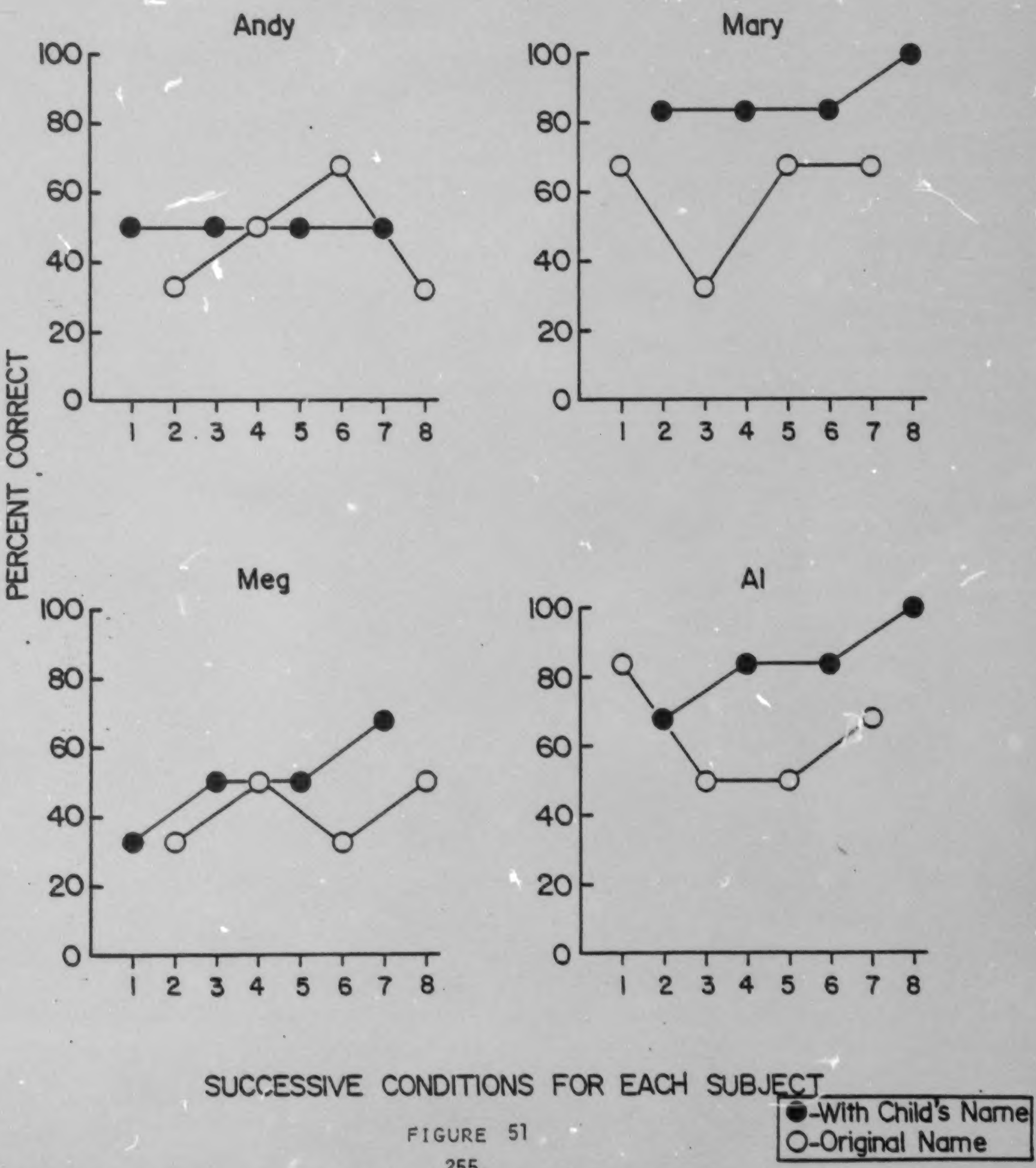


FIGURE 51

COMPREHENSION OF NON-DEPICTED PARTS OF SPEECH BY CONDITIONS EXPRESSED AS PERCENT CORRECT

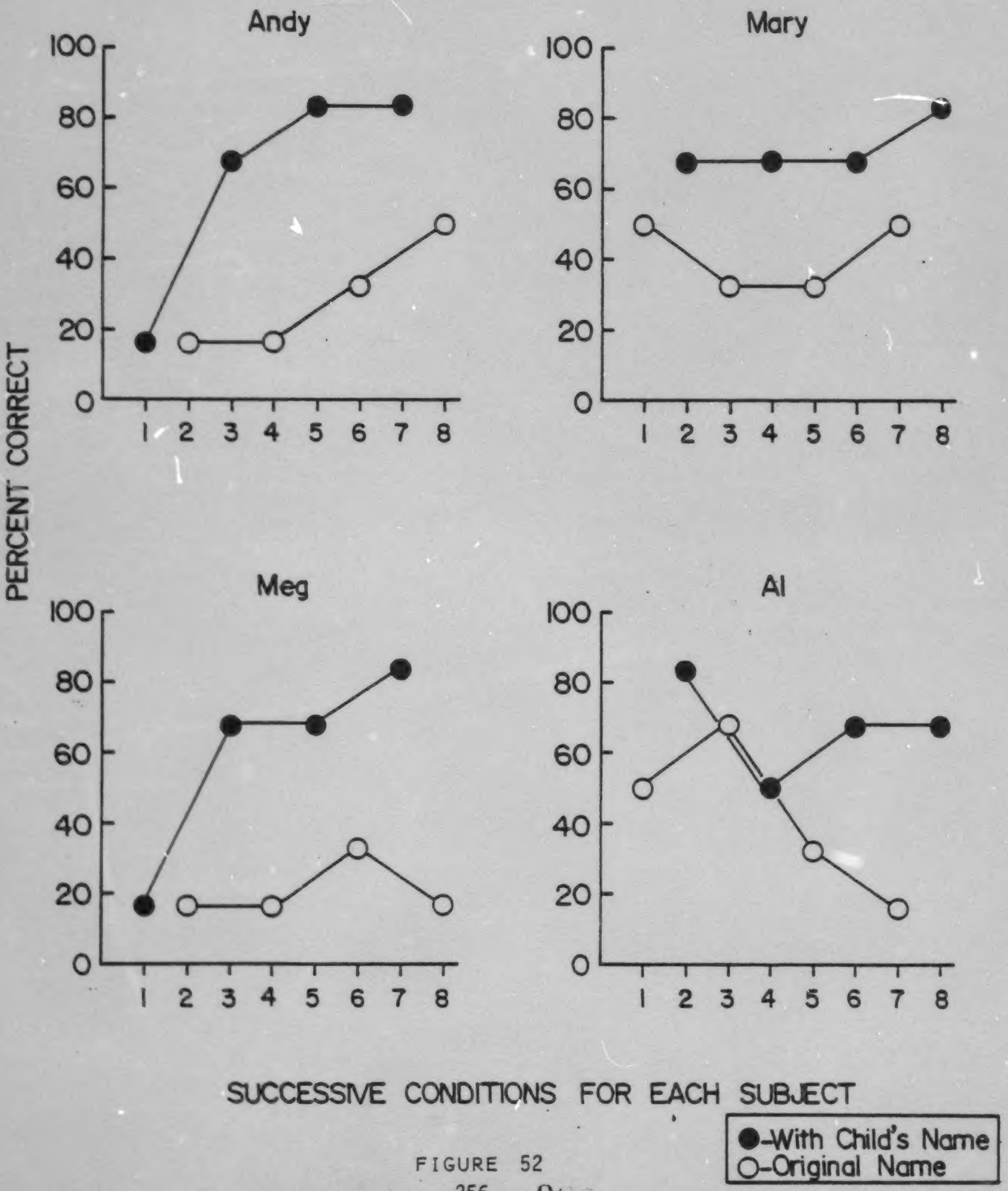


FIGURE 52

COMPREHENSION OF WHY-QUESTIONS BY CONDITIONS
EXPRESSED AS PERCENT CORRECT

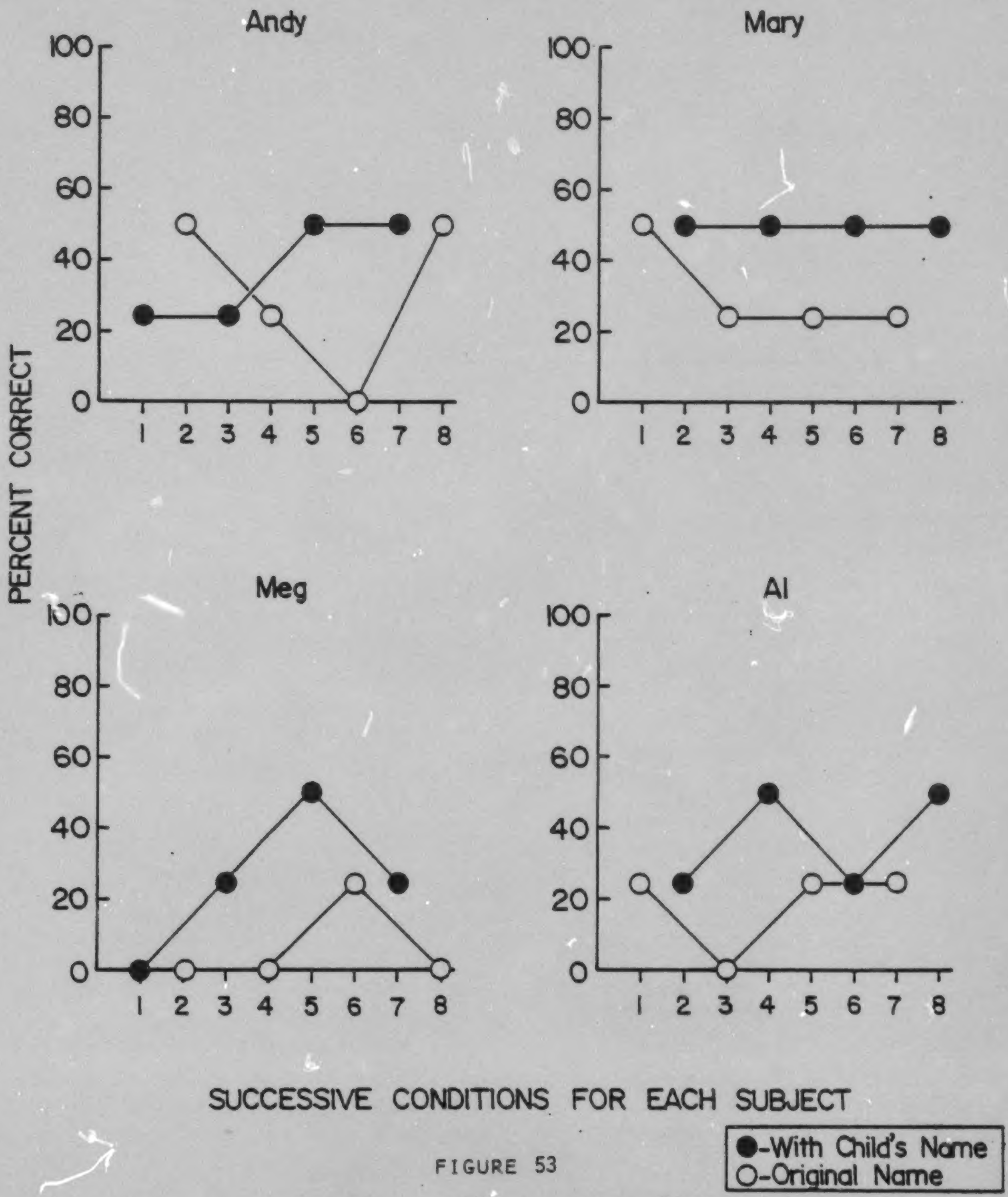


FIGURE 53

aided the comprehension of verse by the two bright children but had no effect on the other two children. Dots had no effect at all on questions about subjects. Dots had a negative impact on the comprehension of objects by bright children and a facilitative effect on them by the at-level and delayed child. Dots had a large positive effect on "why" questions for bright children only.

Discussion. The results of this study are puzzling because of inconsistencies across subjects and types of questions.

## STUDY 20a: THE EFFECTS OF STORYBOOKS ON THE EVERYDAY BEHAVIOR OF YOUNG CHILDREN

(PI: D. Embry)

Purpose. Storybooks attempt, through symbolic modeling, to teach children many things: cooperative interaction with other children, appropriate or creative play with materials, academic-related tasks (e.g., attention-to-task, persistence), helping in clean-up activities, new vocabulary, new syntactical structures, etc. Scant research that documents the effectiveness of storybooks to produce imitative behaviors exists, even though relatively extensive research on the effectiveness of TV and film models to affect the learning of young children exists.

A few studies have explored the topic of imitation and storybooks or storybook analogs. Fischer and Torney (1976) reported that children's stories affected rates of dependency behavior exhibited by kindergarteners. Zebrowitz-McArthur and Eisen (1976) found that, depending upon the sex of the model, storybooks affected the persistence of male and female preschoolers on a fine-motor achievement task. The research by Whitehurst (1977) strongly suggests that verbal modeling with pictorial cues facilitated the selective imitation of passive voice by preschoolers--traditionally a low-rate behavior (Lovell & Dixon, 1967). Wildgen and Sherman (1976) were able to elicit the selective imitation of present, future, and past verb tenses by moderately to severely retarded children with such an approach.

Except the study by Wildgen and Sherman (1976), which was conducted with older retarded children, the research on storybook models has been conducted in a lab setting so that clean experimental control can be demonstrated. What was needed at this point was a demonstration of preschoolers' imitating more real life behaviors from storybooks in a natural setting. This study was such a test.

The behavior targeted for study was pedestrian safety. The choice of pedestrian safety occurred for four reasons: (a) pedestrian accidents are a leading cause of death among preschool-aged children, (b) pedestrian safety receives scant attention in early childhood education settings, (c) accident reports seem to indicate that most of the accidents are the "fault" of the children not the driver, and (d) developmental delays would generally seem to place young children at greater risk for such accidents.

Subjects. Four children were the subjects in this study: Cal, who was 3 years old and language delayed; Abby, who was 2 years old; Mac, who was 5 years old; and Al, who was 3 years old. All children except Al were enrolled in preschool.

Settings. A preschool/daycare center, a community building, and a subsidized apartment complex (where all the children lived) were the settings in which the experiment took place.

Materials. Four specially designed storybooks were created to teach pedestrian-related behavior (i.e., not playing in the street).

Experimental Design. A multiple baseline across children.

Experimental and Recording Procedures. During baseline, the frequency and duration of children's play in the street were recorded outdoors near their homes. A probe of children's concept of safe places to play was also given at the preschool or the community building. During the intervention, a former public school teacher read the specially designed storybooks to the children at preschool or the community building (in the case of Al). One or more probes of children's "safe" concept were given during the storybook intervention. Parents were not advised to the exact timing or nature of the intervention.

Results. Figure 54 shows the results of the experiment. In three out of four cases, storybooks had a strong but short-lived effect on the frequency and duration of children's play in the street.

Discussion. This study is the first experimental demonstration (known to the authors) that storybooks can affect the everyday behavior of children. The behavior in question was socially significant. The principle reason effects were short lived seems to be that parents were unintentionally reinforcing their child's play in the street by attention to inappropriate behavior. This conclusion was based on parent data collected at the time children were playing outdoors. In general, the results support the use of storybooks to change young children's behavior directly.

## STUDY 20b: REDUCING THE RISK OF PEDESTRIAN ACCIDENTS TO PRESCHOOLERS BY PARENT TRAINING AND SYMBOLIC MODELING FOR CHILDREN: AN EXPERIMENTAL ANALYSIS IN THE NATURAL ENVIRONMENT

(PI: D. Embry)

Rationale. The results of the earlier experiment by Embry and Malfetti (1980a), indicating that parents' behavior would have to be changed if children's pedestrian safety were to be increased, set the stage for this experiment. Parents' use of praise and punishment must be altered if there are to be long-term changes in children's play in streets and correlated reduction in pedestrian-vehicle accidents. The storybooks used in Embry and Malfetti (1980a) did not change parental behavior, although they did change children's behavior for a brief period of time.

Thus, an intervention package might be created to change parental behavior in conjunction with the use of storybooks. The storybooks would provide the change in behavior for the parents to reinforce, and the parents would provide the contingencies to maintain the behavior change. The following study was undertaken to test the hypothesis.

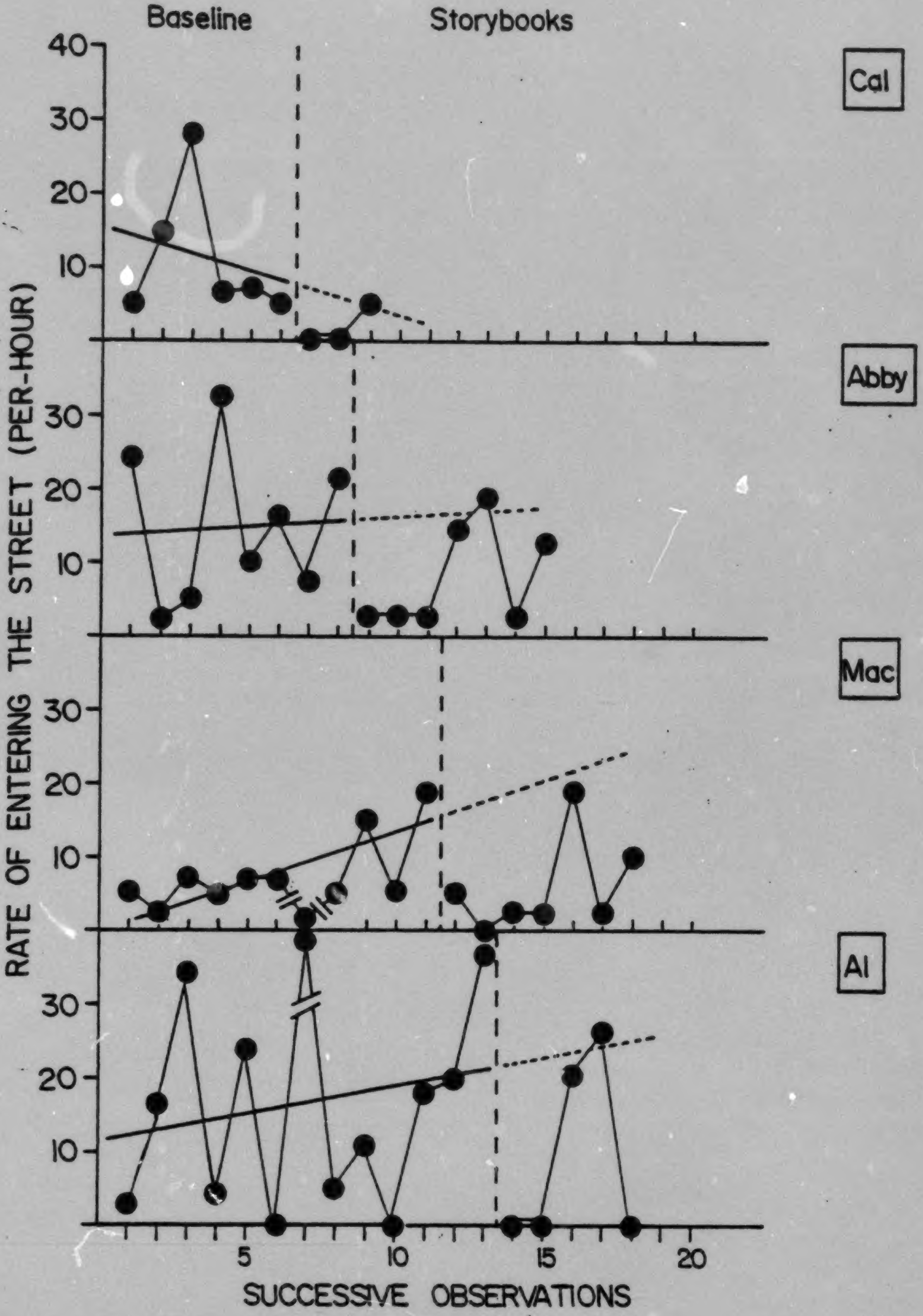

Baseline
Storybooks
40
30
20
10
Cal
Abby
Mac
Al
RATE OF ENTERING THE STREET (PER-HOUR)
5
10
15
20
SUCCESSIVE OBSERVATIONS

FIGURE 54

Subjects/Setting. Thirteen preschool-aged children and their parents participated in the observational phase of the program, and another 20 preschool-aged children and their parents participated in the program but were not observed. The non-observed children and parents filled the ranks of the workshops, which increased the "realism" of the study. Nine of the children had some handicapping condition.

The study involved two settings for each subject: a training site and an observation site. Both parents and children were trained at a preschool and observed at their homes.

Materials. Special materials were prepared for both parents and children.

Parents who attended the special workshops (one workshop per parent) were exposed to a number of materials: a slide show, a poster to take home, a videotape, a handout on using sticker charts and time-out (a punishment procedure), and some other miscellaneous items.

Children heard four storybooks emphasizing playing safely near traffic. The effects of these storybooks had been previously studied (Embry & Malfetti, 1980a). In addition, children's concept of safe play was tested using pictures of children playing safely and unsafely.

Data Collection Procedures. Data were collected on both children and parents at families' homes. Using a 10-second interval code, a team of seven observers recorded children's entries into the street and certain parent-child interactions (e.g., praise for safe play, reprimands for unsafe play). Families were observed for 30 minutes during each observation session, which spanned about 3 months. A postcheck was conducted approximately 6 months after the start of the study.

Experimental Procedures. During baseline, children and parents were observed at home. No intervention took place during baseline.

Five equivalent workshops were scheduled at different times, and parents chose to attend one of them. The workshop taught parents how to reinforce their children's safe play and reduce their unsafe play. Children heard storybooks at the same time that parents participated in the workshop.

Experimental Design. A multiple-baseline design across families was used to evaluate the effects of workshops and storybooks on children's safe play.

Results. Figure 55 concerns children having a high baseline rate of entries into the street, which was defined as two or more observations of 10 or more entries per hour. During baseline, the children represented in Figure 55 averaged 9.7 entries into the street per hour. Following the parent workshop and special storybooks, they averaged 0.7 entries per hour, only 7% of the baseline rate. During baseline, parents praised four intervals of safe play; after the workshop, they praised a total of 130 intervals, 33 times more than the baseline rate. Reduced entries into the street continued throughout the intervention phase.

FIGURE 55

Observed Children with High-Level Baseline Entries into the Street

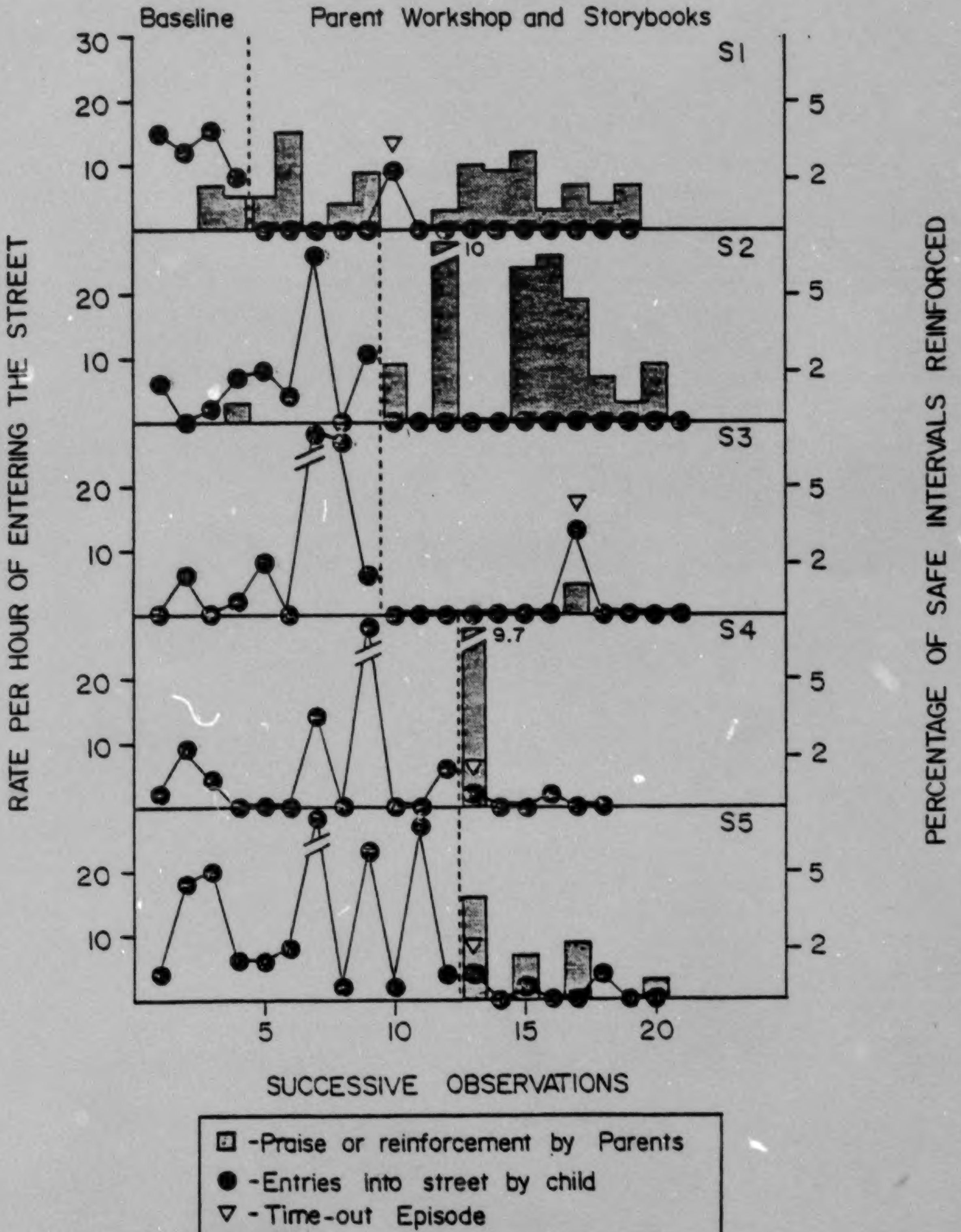


Figure 56 applies to children having a low baseline rate of entries into the street, which was defined as observations with one or no occurrences of 10 entries per hour. During baseline, these children averaged 1.8 entries into the street per hour. After the workshop and storybooks, they averaged 0.2 entries per hour, 10% of the baseline rate.

Discussion. This study was effective in reducing the risk of pedestrian accidents to young children. Embry and Malfetti (1980b), computing the probabilities of cars and children in the street at the same time, have shown that the combination of parent training and special storybooks reduces the risk of such accidents by a factor of 12.

The study adds an important finding to the literature on parent training: Parents can generalize newly taught parent-training skills from the "classroom" to the home if such skills have been targeted on a specific child behavior. Previous research (L. Embry & Baer, Note 1) has shown that most parents do not generalize such skills from "classroom" to home if such skills have been targeted on general parent-child interactions.

Field testing of the Safe Playing Kit (a product developed since completing of this study) has been carried out in 10 states. Results of the field tests are being reviewed by the funding agency (AAA) for distribution (1982) to an estimated 40,000 preschools and day care centers.

## STUDY 21: THE RELATION OF MASTERY TO PREFERENCE CHOICES AMONG PREACADEMIC MATERIALS

(PIs: Parker, Rowbury, and Baer)

Purpose. Some young children may avoid certain preacademic lessons or consistently choose other activities. When learning delays exist, they may become cumulatively worse if patterns of choosing away from needed preacademic lessons persist. The probability of success or achievement (mastery) may influence a child's willingness to engage in certain behaviors, i.e., increase the value of those activities to the child. The purpose of this study was to examine whether experimentally induced item mastery becomes a choice motivator (reinforcer) for young children with learning and/or behavior problems. This question was assessed by noting the children's order of preference among items they were taught to master versus items they could not yet complete.

Subjects. The subjects were three boys ages 4 to 6 years who were enrolled in a classroom for children with learning and behavior problems. Each subject showed patterns of learning delay and a reluctance to attempt certain preacademic items in the classroom's curriculum.

Setting. The study was conducted individually with each subject at two tables placed at one end of the children's classroom. One of the classroom teachers conducted the daily 15-minute sessions. One table was designated the "choice" table. Three similar items were displayed on

Observed Children with Low-Level Baseline Entries into the Street

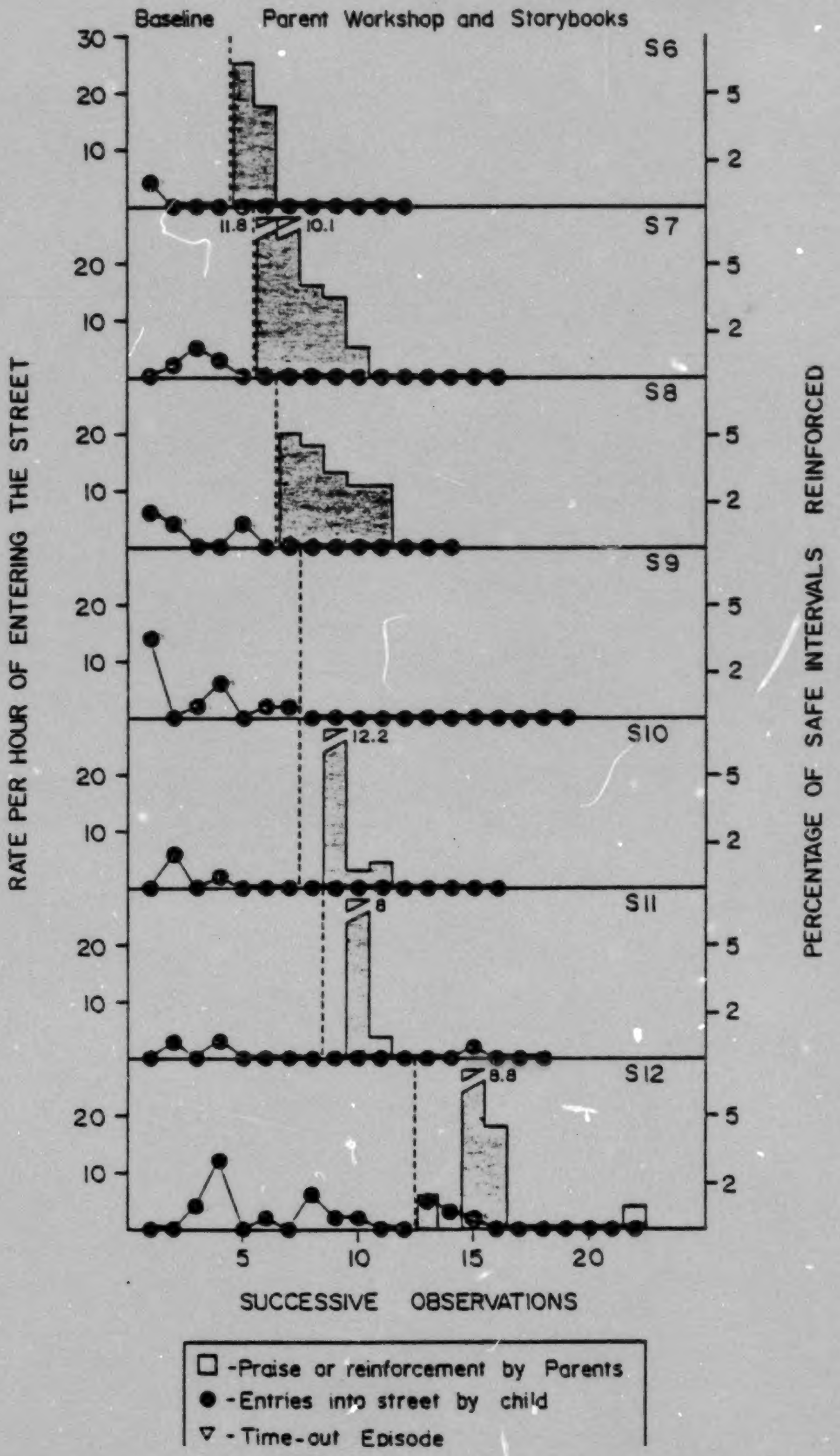


FIGURE 56

the choice table each day, e.g., three puzzles, three parquetry designs. This choice set remained the same until a complete analysis of mastered versus unmastered items could be conducted. The child selected, one at a time, the order in which he wished to contact the three items; then he carried each item as selected (first, second, third) to the second table, where he completed or attempted to complete the task involved with the teacher sitting nearby.

Data Collection. An observer with clipboard and stopwatch was seated in the experimental area. The observer recorded the items in the order selected by the child, the child's completion of any items, the child's on-task behavior (in 10-second intervals), and the occurrence and topography of teacher behavior directed to the child (in 10-second intervals).

Design. The experimental design was an eight component multiple baseline design with components conducted across subjects, and within subjects across sets of materials. During baseline sessions, the children's order of preference among three items in a set was determined by their work choices (first work choice and second work choice). The least preferred item was chosen by the teacher as the target item for training to mastery. Training for the target item consisted of teacher guidance in the form of instructions, prompts, and physical assistance sufficient to enable the child to complete the item within the allotted contact time. The two other items within the set remained untrained.

Results. A total of eight item sets were examined before and after mastery of one item occurred. The results show that mastery of an item influences children's preferences for that item among others. During the training condition of intensive teacher guidance, each child mastered (completed) the target item on the first and all subsequent sessions. A first choice preference was correlated with these mastered items, i.e., the child chose to work first on that item that had been mastered on the previous day. The children continued to prefer the mastered item (chose it first) during the final sessions when only general teacher attention was given for all three items in a set.

Discussion. Behavioral procedures can be used successfully to reverse patterns of cumulative conceptual deficits in young children with learning problems, by reversing their cumulative histories of failure in preacademic skills. By introducing these children to successful completions of a variety of progressive preacademic skills, their histories of failures will change to histories of successes. If the stimuli associated with preacademic learning become discriminative for reinforcement--both extrinsic (social approval) and intrinsic (mastery)--then children with learning problems can become enthusiastic, generalized learners. in whatever contexts they may encounter. Mastery-based teaching procedures are needed for young handicapped children.

## STUDY 22: MASTERY TRAINING AND GENERALIZATION OF GROUP PARTICIPATION ACROSS FIVE LEARNING FORMATS

(PIs: Leidholt, Rowbury and Baer)

Participation in small and large groups is an important set of skills for young children to master in their first school years. Responding in a group involves at least two skills. First, a child must learn to respond in the presence of peers and other classroom distractions. A "group" context may make instructions appear less "salient" than instructions presented in a 1:1 context. Second, and most critical, a child must learn to recognize and respond to teacher instructions and cues when they are delivered to the group, not to that child individually. A child must learn to respond to group instructions "as if they were" individual cues for performance.

Purpose. The purpose of this study was to examine the effectiveness of brief (five-minute) outside tutoring sessions on children's mastery of group instructional formats and subsequent generalized participation in a small group/"group delivered" instruction setting in a preschool classroom. Five group instructional formats were identified from a pool of group activities typically available in a preschool curriculum. Within a multiple baseline design across formats, 1:1 training was initiated to promote mastery of one format at a time. Primary generalization of participation was evaluated in a small group setting within the classroom, where no training or contingencies were applied. In addition, maintenance of generalized participation skills and secondary generalization from trained formats to untrained formats were examined.

Subjects/Setting. The subjects were two 4 year old boys who were enrolled in a preschool classroom for children with learning and behavior problems. Both boys showed deficits in attending and responding during "group delivered" instruction periods. The study was conducted in two settings: 1) a small group instructional setting in the classroom; 2) a 1:1 training setting in a room adjacent to the classroom. One teacher conducted the 1:1 training, while a different teacher conducted the small group generalization sessions.

Data Collection. The primary data of the study were collected in the 12-minute small group/"group instruction" setting within the classroom. An observer recorded the occurrence of child participation, teacher group or individual instructions, and teacher praise to the subject by slashing the appropriate symbols in 10-second interval boxes on the data sheet. Data sheets were also coded for which of the five instructional formats was being presented across a given five-minute period.

Design. Five group formats were identified for this study. They were: Motor Imitation, Verbal Imitation, Motor Instruction, Verbal Label, and Verbal Chains. Each format included activities commonly used by teachers in other preschool and kindergarten classrooms.

A multiple baseline across three group formats was used to assess participation in the generalization setting. During initial baselines, a more frequent rate of assessment was conducted for the first component to be trained. When outside training was initiated for one format, daily probes for that format and one other format were conducted in the generalization setting. Each other format was probed weekly. When outside training was discontinued, daily probes were replaced by probes every other day for the maintenance assessment. When outside training was initiated for a new format, the two day probes for the previously trained format were replaced by weekly probes, and the new format was then probed daily.

The experimenter randomly assigned the non-training formats that would be conducted each day in the generalization setting. Then activities representative of each trained and non-trained format were selected. This selection was made through a repeated series sequencing procedure in which no single activity was presented on consecutive days or for more than three sessions across the entire study. In addition, activities used in training sessions were never presented in generalization sessions.

Results and Discussion. The results of the study indicate that brief five-minute outside tutoring sessions were effective in producing mastery of the group formats to which training was applied. Three formats were trained successively for Subject 1. This trained mastery then generalized immediately to Subject 1's participation in the small group instructional setting. Similar results were obtained for Subject 2 in whom two formats were trained. However, Subject 2's performance generalized completely to the group setting only after the experimental teacher was introduced briefly into that setting. When the group teacher again replaced the experimental teacher, Subject 2's generalized participation in the group was maintained. At the termination of the study, both subjects were participating in all five group formats at levels equal to their skilled peers.

Following mastery training the subjects' skilled participation generalized across many different stimulus conditions: across time, there were twenty minutes between the training sessions and the generalization sessions; across group size, training was 1:1 and generalization was 1:3; across teachers, the experimenter conducted training sessions, and a different teacher conducted the small group generalization sessions; across environmental settings, training was outside the classroom, and the small group was conducted within the classroom; across activities, activities presented in the training setting were never presented in the small group generalization sessions; and across instructional and reinforcement contexts, a higher rate of individual instructions and reinforcement were used in the training setting than in the generalization setting.

Stokes and Baer (1977) suggest that programming common stimuli may be one method to facilitate generalization across settings. It may be that the antecedent instruction to participate was the common stimulus that cued Subject 1's participation in both settings. The results with

Subject 2 indicated that acquisition of generalized participation may be slower for some children, and that an added stimulus "boost" may be necessary to promote generalization across settings. For the second subject, the temporary addition of the experimenter in the place of the teacher in the generalization setting may have served as the salient cue or added boost to promote generalization. When the experimenter was again replaced by the teacher, participatory behaviors were maintained.

In both subjects, brief mastery training appeared to have facilitated the development and maintenance of a generalized repertoire of group participation skills. The durability of participation in each format following the termination of training suggests that group responding had come under control of natural contingencies of reinforcement within the activities and the group process itself. Because group formats are frequently used in kindergarten classrooms, planning for the mastery and generalization of group participation skills could facilitate a handicapped child's transition into public school, leading to a more successful educational experience.

## STUDY 25a: WORKBOOK FORMATS: AN ANALYSIS OF MULTIPLE EXEMPLARS FOR TEACHING GENERALIZED NUMBER-NUMERAL CORRESPONDENCE

(PIs: Solnick and Baer)

Purpose. Some young children have difficulty decoding the formats of lessons presented in public school instructional materials. Workbooks and similar teacher-constructed paper-and-pencil instructional materials may pose format problems for young learning delayed children in the early years of school. This study examined the responses of preschool-aged children to five format exemplars of the number-numeral correspondence lessons found in beginning level (kindergarten) workbooks. Three questions were asked: Are there children who can correctly and consistently solve problems in some format(s) but not others? If so, can generalization to all five formats be produced by training a subset of the formats (i.e., exemplars)? If generalization across formats is limited, is the structure of this limitation such that generalization occurs within but not across predictable subclasses of the five formats?

Subjects/Setting. Subjects were 4 and 5 year old children selected from two preschool classrooms--one normal classroom and one for children with learning and behavior problems. Ten children from the normal classroom and seven from the behavior problem classroom were tested on their performance of the five number-numeral formats. From this pool, four subjects (two from each classroom) were found to lack mastery of at least two of the five formats. These children were selected as experimental subjects. Experimental sessions were conducted in a small experimental room near the classrooms for 15 minutes each day.

Data Collection. Correct responses were defined for each math format. Subjects were given pages with three problems per format, one format at a time, which they completed during the daily experimental sessions. Correctness of responses was evaluated and a percent correct score was derived for each of the five formats.

Design. The design of the study was a probe analysis of the subjects' correct responses in all five formats before and after successive training conditions of one format at a time. The experiment began with several probe sessions for the first group of three numbers (typically 1, 2, and 3), with each session including one complete set of Formats 1-5. During the first of these probe sessions, the experimenter modeled the correct performance in each format immediately before presenting the format to the child. One of the formats in which the child did not show mastery was then selected for training. Following training, several additional probe sessions were presented to assess any resultant generalization to the untrained format(s). Correct performances in all formats were modeled during the first probe session following training. If there remained two or more formats in which the child did not show mastery, a second format was trained, and then all formats were probed again. This was continued until the child showed mastery in all five formats for this group of three numbers. When possible, this entire sequence was repeated with a second group of three numbers (typically 4, 5, and 6).

Results. The data of the study yielded the following results:

1. Some children are able to solve number-numeral correspondence problems in some formats but not others. This failure to generalize across all formats was found both following training on a particular format, and before any experimental training had occurred.

2. Twelve children who were evaluated did generalize correct responding to all five workbook formats. The four who did not generalize number concepts across the formats appear to represent a subgroup for whom formats are a clear and serious problem.

3. In the group of experimental subjects the failure to generalize across all five formats was remediated by training in one, two or (at most) three formats. These data are consistent with a broad range of research in which training of one or more exemplars is found to be a useful strategy for promoting considerable stimulus and response generalization (e.g., Allen, 1973; Garcia, 1974; Griffiths & Craighead, 1972; Guess, Sailor, Rutherford, & Baer, 1968; Schumaker & Sherman, 1970; Stokes, Baer, & Jackson, 1974; for a review see Stokes & Baer, 1977).

4. The data suggest also that in a given pool of formats a structure may exist such that performance in some formats tends to covary (i.e., present a response class). In the present pool of five number-numeral formats, Formats 1, 2, and 3 tended to covary, as did Formats 4 and 5.

Discussion. These data have implications for teaching number-numeral correspondence, but also other instructional formats, to preschool children with learning difficulties. Formats 1-5 in this study were derived from a variety of kindergarten arithmetic workbooks, and they represent many of the types of formats a kindergarten child will be likely to encounter. Similar format groups should be found in instructional materials for other academic areas. Given sufficient time, one could often insure success on all formats simply by training in each of them. However, when resources are limited, it may be necessary to order the formats into response classes so as to have the greatest probability of generalization to many formats after training in only a few of them. For example, the present data suggest that training in number-numeral formats should include at least one member of Formats 1-3 and one member of Formats 4 and 5.

## STUDY 25b: DESCRIPTION ANALYSIS OF WORKBOOKS
(PIs: Paine and Rowbury)

Purpose. This study was designed to further analyze the responses and formats found in the workbooks that are presented to children in the early school years. The results of Solnick and Baer (Study 25a) indicate that some children respond differentially (well or poorly), depending on the format of the instructional material, distinct from the academic content. If sets of responses and formats could be derived from existing instructional materials through descriptive analysis of those materials, then training could focus on teaching key responses and format types as remediation or as preparation for the transition from preschool to public school settings.

Procedure. Samples of the math and early reading workbooks being used in the local school district were obtained. Each workbook and its accompanying instructions were then analyzed page-by-page by the first author and assistants. The following information was collected: 1. Grade level; 2. Child's age; 3. Recommended way of delivery; 4. Scope of concepts; 5. Responses required, e.g., "draw x", "circle", "underline"; 6. Directions (to teacher or child); 7. Sources of confusions in page formats; 8. Strengths and weaknesses.

Results and Discussion. It is anticipated that the individual protocols derived from the analyses of six separate workbooks can be used to develop pools of responses that can be taught to young children prior to their contact with formal workbook materials. There was variability in numbers and types of responses required across workbooks. For example, one early reading workbook required only two types of responses--"underlining" and "draw a line to" (Houghton-Mifflin: Getting Ready to Read: $HM_1$). By contrast, one early math workbook required six types of responses--"draw x", "trace", "circle", "free draw", "draw line", and "print number" (Heath Kindergarten Level Mathematics $H_1$). Workbooks also varied greatly in their use of irrelevant visual distractions and in the amount of practice given for the key responses.

From the results of the descriptive analysis of workbooks, a manual of responses, illustrations, formats, and teaching instructions is planned. This manual could be used by teachers in remedial or early intervention settings when the goal is either preparation for school transition or remediation of existing format problems.

# PROGRESS CHART FOR RESEARCH STUDIES

## ASSESSMENT GUIDES TO INTERVENTION

■ Activities Completed
◣ Activities in Progress
▨ Activities Projected
═ Studies Repeated
NA Not Applicable

| ETZEL | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. DEVELOPMENT OF A LEARNING-ASSESSMENT MODEL | ■ | ■ | ■ | NA | ■ | ■ | NA | ■ | ■ | ■ | 1982 |
| 1A. DEVELOPMENT OF INTERVENTION PROCEDURES BASED ON MODEL | ■ | ■ | ■ | NA | ■ | ■ | NA | ■ | ■ | ■ | 1982 |
| 2. TEACHER TRAINING INVOLVING LEARNING-ASSESSMENT MODEL | ■ | ■ | ■ | NA | ■ | ■ | NA | ■ | ■ | ■ | 1982 |
| 3. PILOT STUDIES ON INTERVENTION PROCEDURES | ■ | ■ | ■ | ■ | ■ | ■ | NA | NA | NA | NA | 1982 |
| 4A. WORD RECOGNITION LEARNING ASSESSMENT | ■ | ■ | ■ | ■ | ■ | ■ | NA | ■ | ■ | ■ | 1982 |
| 4B. BLENDING INTERVENTION FOR NEW SIGHT WORDS | ■ | ■ | ■ | ■ | ■ | ■ | NA | ■ | ■ | 1983 | |
| 4C. VISUAL SCANNING ASSESSMENT AND INTERVENTION | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | 1982 | |
| 4E. ERRORLESS AUDITORY LEARNING ASSESSMENT | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | ■ | 1982 |

FIGURE 57

# CHAPTER III ASSESSMENT GUIDES TO INTERVENTION TECHNIQUES

## Introduction

The Kansas Research Institute for the Early Childhood Education of the Handicapped has as one of its major goals the development and validation of assessment devices which identify young children who may be at-risk for handicapping conditions and which lead to prescriptive intervention procedures. In general, an assessment device is one which provides a systematic procedure for observing behavior of a person and then translating it into a numerical scale or a category system (Cronbach, 1970). Such an assessment device becomes prescriptive when specific results of the assessment are directly related to specific intervention strategies that have proven to be successful with other individuals who demonstrate similar behaviors on the assessment device.

Within the general goals of the Institute, the research conducted within the Assessment Guides to Intervention section has addressed the following:

Goal 1.1: Evaluating the effectiveness of existing assessment devices and developing new methods for early identification of children with a broad range of handicapping conditions.

Goal 1.2: Identifying critical environmental variables which influence the learning and developmental status of the handicapped and at-risk child, and monitoring the child's performance under various environmental settings and parameters.

Goal 1.3: Developing intervention strategies which emerge from research on the identification of variables that affect the learning of handicapped or at-risk children.

## ASSESSMENT GUIDES TO INTERVENTION

QUESTION A: HOW CAN A DISCRIMINATION LEARNING MODEL BE USED TO DEVELOP AN ASSESSMENT-GUIDED INTERVENTION? (Investigator: Etzel)

The research carried out under the Kansas Research Institute for the Early Childhood Education of the Handicapped in the area of assessment (Etzel's section) can be summarized under four major studies:

I. Development of a learning-assessment and intervention model for preschool children's conceptual skills.

II. The assessment and training of pre-reading skills: Blending of sounds, syllables, and words.

III. Visual scanning assessment and intervention.

IV. Auditory learning assessment and intervention.

Although all of the above studies are interrelated in this approach to assessment, each will be presented individually to demonstrate examples of a learning-assessment approach to this complex issue. Assessment (or "diagnosis", as the more medically oriented psychometrists refer to the topic), is approached from a behavioral orientation in a very different manner than has been the tradition in the past. The main differences of the behavioral approach to assessment (when compared with the traditional psychometric procedures) are the following:

1. Assessment while the subject is learning a skill (rather than testing for the presence or absence of a skill).

2. All data is calculated on an individual analysis basis, including reliability and validity.

3. An analysis of the subject's responses (when incorrect) to determine what other stimuli are controlling responding.

4. Information from each individual assessment leads directly to prescribed intervention procedures.

5. Procedures developed so that the person directly involved in training will be the same person carrying out the assessment.

6. Assessment should be carried out over time, not on a once or twice sample.

Each of the above characteristics of a behavioral assessment have been applied in the four different studies noted above (except for item 5 which is still being developed in Studies III and IV).

The rationale for designing a learning-assessment procedure that encompasses these six characteristics has resulted from a dissatisfaction of the current psychometric tests that purport to measure cognitive skills. With the exception of criterion-referenced tests, psychometric procedures have not really measured the very behavior which they are hoping to predict in the future. Most studies of validity seem to be designed to predict how well a person will learn some skill in the future. Hence, a measure of how well a person currently learns a variety of skills should relate better to how well that person will learn some skill in the future than a test of the presence (or absence) of a current skill. A measure of learning, not a test of the presence of some skill, is the first characteristic of a behavioral assessment.

Since it is the behavior of an individual, not a group of people, that is the concern of the teacher, parent or clinician, then an assessment procedure must be evaluated on how much the information on each individual will help current and future educational planning. This means all data is evaluated from an individual analysis strategy.

When incorrect responses are emitted to any of the learning tasks, then it should be possible for an analysis to be made which would yield information on what stimulus is controlling responding if a desired ("correct") stimulus is not. This would tell the teacher or parent to change the teaching environment so that a change of response from one controlling stimulus to a more desired stimulus could be made.

Unless the assessment yields information about how to change the teaching environment to achieve help for some children, then the time or money spent for the assessment is not helpful. Diagnosis, in itself, is not a goal to pursue, although with most current psychometric tests this seems to be the only product.

The person who carries out the assessment should be the same person who will arrange for some change in the academic environment to help a child learn. The school psychologist or clinician who traditionally has tested children has been, almost without exception, incapable of giving teachers or parents information on how to teach the child academically (in the future) based on test findings. This problem is due to both inappropriate assessment instruments (tests) and lack of knowledge by the clinicians about school classroom subjects. With teachers collecting the assessment data, they can determine in each instance how a child is currently learning or why the child is not learning. This process will lead directly to remedial procedures in the latter cases. When the teacher asks the specific questions of an assessment necessary for future planning for a child, then the teacher must be the one who administers that assessment procedure. Finally, if one is predicting how a child will learn in the future in a particular setting, then the assessment must be carried out in the same setting. A school classroom is the correct assessment setting, if future predictions are about behavior in a school classroom. Quiet, one-to-one testing rooms probably result in a great deal of predictive error for some children.

With the teacher carrying out the assessment, it is very simple to build into the teaching procedure continuous assessment while the children are learning. As most behaviorists have found out, data on behavior over time is the most reliable measure. Called "baseline" by those involved in the experimental analysis of behavior, this history of observation of a response will allow a teacher to make decisions regarding how well a child is learning, and the effect of an intervention if one is called for. A sample(s) of test behavior is quite unreliable due to the many variables that may affect the test(s) on any one occasion. Such variables, however, would not be consistently present on every occasion if the assessment were carried out over time. When teachers build an assessment procedure into the everyday teaching process then the practice of carrying out the assessment over time is automatic.

The six characteristics of a behavioral assessment that have been summarized above were built into four studies (in some form) so that the most functional form of an assessment procedure could be approached.

The following summary, therefore, will describe each of the four major studies and the methods of incorporating the above six characteristics into the assessment procedures.

Our choice of the four major studies across the five years of funding (by B.E.H.) was designed to fill assessment voids in areas that have, to date, not been well researched. For example, an in-class teacher-administered preschool assessment procedure that helps teachers design training programs for at-risk children was not available until the results of this study were published (Etzel, Aangeenbrug, Nelson-Burford, Holt, & Stella, 1982). Further, assessment procedures for measuring visual scanning and auditory attention with preschool children were not well developed until research on the procedures was accomplished with this grant. Finally, since beginning reading is considered to be one of the most important areas of education for most retarded children, then assessment and training procedures on one aspect of beginning reading (blending) was chosen for study. Thus, research into the assessment of conceptual skills, visual scanning, auditory attention and blending skills has been the primary goal of this laboratory during the past five years. Each of these major studies was further divided into several projects that were carried out to systematically examine several variables or questions that were felt to be important to the area under study.

Due to the complexity of these studies, the usual format has been replaced by a report which comprises Appendix A.

## QUESTION B: WHAT IS THE ROLE OF INSTRUCTIONAL VARIABLES IN IDENTIFYING, PRESCRIBING, AND IMPLEMENTING OPTIMAL TEACHING-ASSESSMENT PROCEDURES? (Investigator: LeBlanc)

Academic, as well as preacademic learning involves interactions between (a) perceptual materials, (b) the learner's responses to those materials, and (c) the setting events which precede and maintain the learning process. The interaction of these variables in the learning environment is important for all children but is especially critical for children experiencing learning difficulties.

The research described in this section emphasizes the third category of stimulus interactions: the setting events which precede and/or maintain during the learning process. Typically, these setting events include instructional variables provided in the learning environment. Instructions tell children what to do and are provided at the outset as well as during the completion of a learning activity. It is frequently thought, when children do not respond correctly, that it is because their motivational state is not high. Continued attempts, however, to increase motivational levels often fail. All too frequently, the method of instructing the child is at fault. The child may not understand instructions because they are too complex, because they involve too much unnecessary detail, because they are too sparse or too frequent, or because they may not offer the child sufficient opportunity to respond.

In keeping with the major goals of the University of Kansas Early Childhood Institute, the research described here had three purposes:

1) to identify optimal instructional procedures for working with at-risk children;

2) to derive methods for prescribing the best instructional strategies for individual children and tasks; and

3) to seek methods for implementing these optimal strategies so that the cost of the teaching environment and the requirements of teachers in that environment will be minimized.

### STUDY 1: A COMPARISON OF MINIMAL AND DETAILED INSTRUCTIONS (PIs: LeBlanc, Hass, and Ruggles)

Miller and LeBlanc (1973, 1974) suggested that minimal instructions are more effective for teaching a simple discrimination to children than detailed instructions (e.g., "This is the word dig. Point to dig and say dig." vs. "This is the word dig. You can dig with a shovel, you can dig in the ground, and you can dig in the sand. It's fun to dig. Point to dig and say dig."). The extra information provided in the more detailed instructions did not refer the subjects to the essential differences between the two words to be discriminated. According to Schilmoeller and Etzel (1977), prompts which are not related to the essential differences

# PROGRESS CHART FOR RESEARCH STUDIES

## ASSESSMENT GUIDES TO INTERVENTION

■ Activities Completed
◣ Activities in Progress
☐ Activities Projected
▬ Studies Repeated
NA Not Applicable

| LeBLANC | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7A. TEACHERS' USE OF EXEMPLARS IN DISCRIMINATION LEARNING | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | | SRCD |
| 7B. CRITERION-RELATED AND NON-CRITERION-RELATED DETAILED INSTRUCTIONS | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | | AABT |
| 7C. TWO-CHOICE DISCRIMINATION OF SIMPLE THREE-LETTER WORDS | ■ | ■ | ■ | ■ | ▨ | NA | NA | ■ | ■ | | ABA |
| 8. TEACHERS' USE OF TIME LIMITATION IN DISCRIMINATION LEARNING | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | AABT | |
| 9. COMPARATIVE EFFECTS OF FORWARD AND BACKWARD CHAINING | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | APA | |
| 10. EFFECTS OF DELAYED FEEDBACK ON DISCRIMINATION LEARNING | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | APA | |
| 10A & 10B. A COMPARISON OF MASSED AND INTERMIXED STIMULUS PRESENTATIONS | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | AABT | |
| 11. ASSESSMENT/PRESCRIPTION OF OPTIMAL INSTRUCTION STRATEGIES | ◣ | ◣ | ◣ | ◣ | ◣ | NA | NA | ◣ | | | |
| 12A. IMPLEMENTATION OF OPTIMAL TEACHING STRATEGIES | ■ | ■ | ■ | ■ | ■ | NA | NA | | | | ABA |
| 12B. INSTRUCTIONAL CONTROL OF MOTOR BEHAVIOR | ■ | ■ | ■ | ■ | ■ | NA | NA | ◣ | ▨ | | |
| 12C. PRESCRIPTIVE PROCEDURES BASED ON ENVIRONMENTAL ASSESSMENT | ■ | ■ | ■ | ■ | ▨ | NA | NA | ▨ | ▨ | | |
| 12D & 12E. TEACHING ASSESSMENT STRATEGIES: FURTHER STUDIES | ▨ | ■ | ■ | ▨ | ▨ | NA | NA | ▨ | ▨ | | |
| 13A. TEACHING ASSESSMENT STRATEGIES: INDIVIDUAL VS. GROUP | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | APA<br>GATLINBURG<br>AABT | |
| 13B. OBSERVATIONAL AND MEDIATIONAL LEARNING OF CONCEPTS IN GROUP SETTINGS | ■ | ■ | ■ | ■ | ■ | NA | NA | ■ | ■ | APA | ABA |
| 13C. LEARNING OF VERB-NOUN CORRESPONDANCES | ▨ | ■ | ■ | ▨ | ▨ | NA | NA | ▨ | ▨ | | |
| 13D. EFFECTS OF PROBES OF ACQUISITION ON OBSERVATIONAL LEARNING | ▨ | ■ | ■ | ▨ | ▨ | NA | NA | ▨ | ▨ | | |
| 13E. EFFECTS OF INSTRUCTIONS ON OBSERVATIONAL DISCRIMINATIVE LEARNING | ▨ | ■ | ■ | ▨ | ▨ | NA | NA | ▨ | ▨ | | |

FIGURE 58

in the criterion discrimination stimuli are less effective in establishing the discrimination than those which are.

Based on these findings, Hass, Ruggles, and LeBlanc (1979) compared minimal instructions with criterion-related instructions. An example of criterion-related instructions is, "This is the word 'dig'. The word 'dig' has the letter 'i' in the middle. The letter 'i' looks like a shovel and you can dig with a shovel. Point to the 'i' in dig and say 'dig'." With these detailed instructions, the child's attention was drawn to the center letter, which was the critical dimension upon which the discrimination was to be made. Results indicated that criterion-related, detailed instructions were at least as effective, if not more so, than minimal instructions for enhancing discrimination acquisition. Because these results did not support the conclusions of Miller and LeBlanc (1973, 1974), two experimental questions remained to be answered--the first: Could the results of Miller and LeBlanc be replicated? the second, assuming the results could be replicated: What would occur if detailed instructions were directly compared with criterion-related, detailed instructions? This latter question stems from the possibility of interaction effects resulting from the type of research design utilized.

*Purpose*. The purpose of this experiment was to answer the first question as indicated by Miller and LeBlanc (1973, 1974): Do minimal instructions result in more efficient learning than detailed instructions?

*Subjects/Setting*. Four preschool children from the Department of Human Development Child Development Laboratory served as subjects. They were individually taught in a small room adjacent to their preschool classroom.

*Data Collection*. Correct and incorrect responses were recorded by the experimenter and by a reliability observer on a predesigned data sheet.

*Experimental Design/Procedures*. The design included pretest, training, and posttest sequences. Data were extracted from daily probes, or tests, of the criterion discriminations being taught. Responding on these probes resulted in no feedback. Each subject daily was taught two word pairs, one with minimal instructions, the other with detailed instructions. When criterion performance was reached on these two word pairs, two more word pairs were taught with the same procedures.

*Results*. The accompanying Figure 59 indicates the results of this experiment. The graph shows the differences between each subject's responding on probes following detailed instructions and those following minimal instructions. If the percentage correct was higher for a particular subject for detailed instructions than for minimal, the difference between the two is indicated above the zero line. If the opposite were true, the difference is indicated below the zero line. Three of four subjects had a greater percent correct on daily probes following minimal instructions.

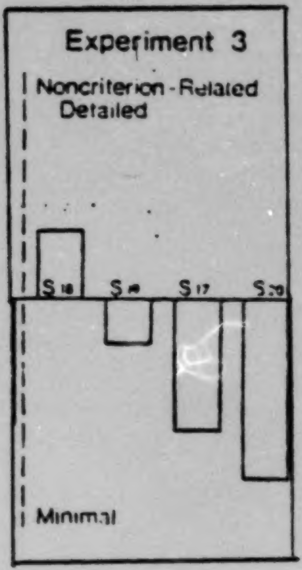

Experiment 3
Noncriterion - Related
Detailed
S18
S
S17
S20
Minimal

Figure 59

Discussion. The results indicated that detailed instructions were not as effective as minimal instructions for enhancing children's discrimination acquisition. This conclusion supports the work of Miller and LeBlanc (1973, 1974) and thus indicates that the relatedness of the instructions to the actual discrimination was the factor that produced different results in the Hass, Ruggles, and LeBlanc (1979) research. The conclusion remains that teachers should give short instructions whenever possible, but when longer instructions are needed, they should be directly related to the stimulus dimensions involved in the discrimination being taught.

## STUDY 2: A COMPARISON BETWEEN CRITERION-RELATED AND NON-CRITERION-RELATED DETAILED INSTRUCTIONS

(PIs: LeBlanc, Hass, and Ruggles)

Purpose. The purpose of this study was to compare the effects of criterion-related detailed instructions and non-criterion-related detailed instructions on the acquisition of discriminations between simple three-letter words.

Subjects/Setting. The subjects were four preschool children, aged 3 years-6 months to 4 years-5 months, from the Department of Human Development Child Development Laboratory. They were individually taught in a small room adjacent to their preschool classroom.

Data Collection. Data were recorded by the experimenter and by a reliability observer on a predesigned data sheet. Correct and incorrect responses were recorded.

Experimental Design/Procedures. The design included pretest, training, and posttest sequences. Data were extracted from daily probes, or tests, of the criterion discriminations being taught. Responding on these probes resulted in no feedback. Each subject was taught two word pairs daily: one with criterion-related detailed instructions, the other with non-criterion-related detailed instructions. When criterion performance was reached on these two word pairs, two more word pairs were taught with the same procedures. The sequence of training of the two word pairs was alternated daily.

Results. Figure 60 indicates the results of the sequence of experimental studies conducted by LeBlanc, Hass, and Ruggles. The graph labeled "Experiment 4" shows the results of the current experiment. The bars on the graph indicate the differences between each subject's responding on probes following detailed instructions and those following minimal instructions. If the percentage correct was higher for a particular subject for non-criterion-related detailed instructions than for criterion-related detailed instructions, the difference between the two is indicated above the zero line. If the opposite was true, the differences are indicated below the zero line. Essentially, there appear to be no differences between these two instructional conditions.

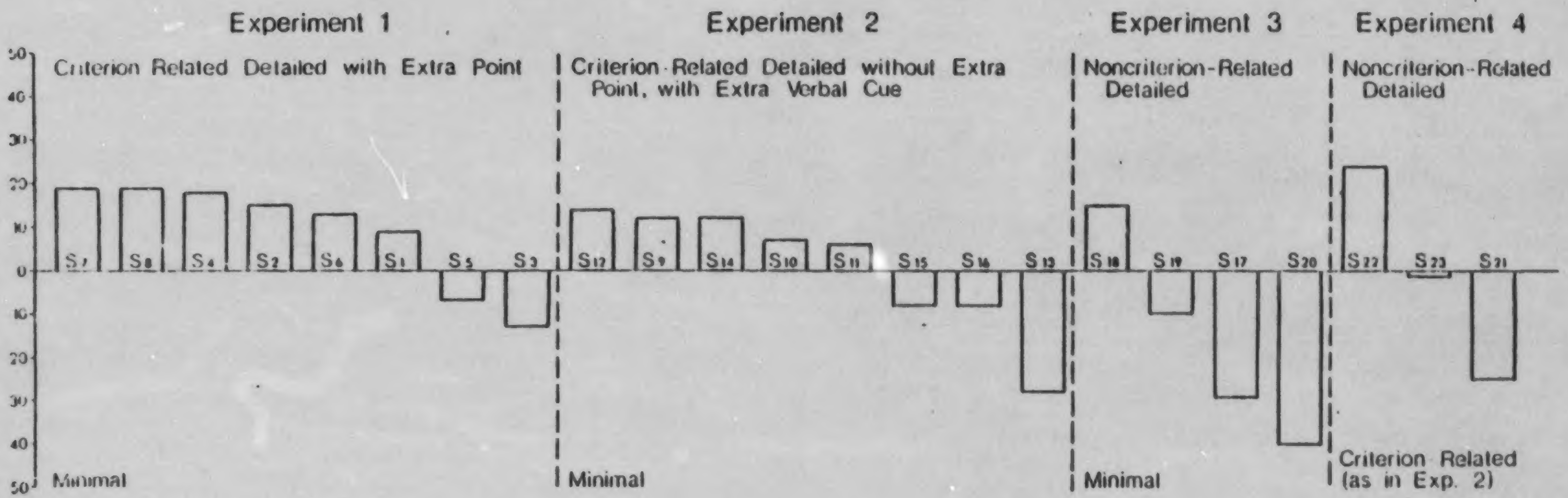

Experiment 1
Criterion Related Detailed with Extra Point
Experiment 2
Criterion-Related Detailed without Extra Point, with Extra Verbal Cue
Experiment 3
Noncriterion-Related Detailed
Experiment 4
Noncriterion-Related Detailed
Percentage
50
40
30
20
10
0
10
20
30
40
50
S7
S8
S4
S2
S6
S1
S5
S3
S12
S9
S14
S10
S11
S15
S16
S13
S18
S19
S17
S20
S22
S23
S21
Minimal
Minimal
Minimal
Criterion Related (as in Exp. 2)

Figure 60

Discussion. The results indicated that there are few differences between the effects of non-criterion-related detailed instructions and criterion-related detailed instructions on the acquisition of a simple discrimination. The effects of non-criterion-related detailed instructions were enhanced by association with criterion-related detailed instructions. This enhancement can be seen by comparing the non-criterion-related detailed instruction results obtained in Experiment 4 with those obtained in Experiment 3 in which non-criterion-related instructions were associated with minimal instructions. This interaction effect supports the conclusion that criterion-related instructions are powerful in their enhancement of discrimination.

## STUDY 3: A COMPARISON OF CRITERION-RELATED INSTRUCTIONS DESCRIBING ONLY THE S+ WITH THOSE DESCRIBING THE S+ AND S- IN A TWO-CHOICE DISCRIMINATION OF SIMPLE THREE-LETTER WORDS

(PIs: LeBlanc, Villalba, Navarrete, Stella, Ruggles and Etzel)

All of the research conducted thus far on the questions of minimal and detailed instructions utilized only instructions describing the S+. If criterion-related detailed instructions for S+ and S- were included, the length of the instructions would be twice that used for describing S+ only with criterion-related detailed instructions. It was not known if this lengthening of instructions would further enhance the effects of criterion-related instructions, whether it would decrease their effectiveness, or whether there would be essentially no differences when criterion-related instructions were applied in these two ways.

Purpose. The purpose of this research was to compare the effects of criterion-related instructions describing only the S+ with those describing the S+ and S- in a two-choice discrimination of simple three-letter words. A second purpose was to compare the results between a group of children who could identify vowels and a group who could not.

Subjects/Setting. The subjects were eight preschool children from the Department of Human Development Child Development Laboratory. They were individually taught in a small room adjacent to their classroom.

Data Collection. Correct and incorrect responses were recorded by the experimenter and a reliability observer on a predesigned data sheet.

Experimental Design/Procedures. Two sets of word pairs (dig and dog, cup and cap) were the visual stimuli. Criterion-related instructions were used to describe either the S+ only or the S+ and the S- stimuli depending upon the experimental condition assigned. The criterion-related instructions were those used by Hass, Ruggles, and LeBlanc (1979) (e.g., "This is the word 'dig'. The word 'dig' has the letter 'i' in the middle. The letter 'i' looks like a shovel and you can dig with a shovel. Point to the 'i' in dig and say 'dig'."). Thus, the child's attention was drawn to the center letter which was the critical dimension for the discrimination. The design included pretest, probes, or tests, of the criterion discriminations being taught. Responding during probes resulted in no feedback. Each subject was taught two

316

word pairs, one with criterion-related instructions for the S+ and the S-. The sequence of training of the two-word pairs was alternated daily.

Results. There were no real differences between applying criterion-related instructions for only the S+ or for both the S+ and S- (Figure 61). Half of the children had difficulty learning the task and three of these four were children who were unable to identify the vowels in the word stimuli. To determine if the problem for these children was too many words and/or the instructions were too long, minimal instructions were implemented for one of the word pairs. This did not, however, result in immediate acquisition for the children. The long history of failure with the tasks could have interacted with the potential effects of the minimal instructions.

Discussion. Since there were no real differences between discrimination acquisition of criterion-related instructions for S+ or for S+ and S-, it would be more practical to use them for S+ only. Teaching time would be greatly decreased. It is also possible that drawing a child's attention to the S- might preclude discrimination acquisition for some children, particularly those with learning problems.

### STUDY 4: A COMPARISON OF 4-SECOND, 12-SECOND, AND 16-SECOND LIMITATIONS ON RESPONDING ON A PRACTICE TASK

(PIs: LeBlanc, Kramer, and Ruggles)

Research by Busby and LeBlanc (1972) indicated that the placement of time limits on responding by preschool children resulted in less variable and more accurate responding on practice tasks. Although the Busby and LeBlanc study presented some interesting information regarding the interaction of stimulus presentation methods and optimal child responding, it did not provide insights into the effects of temporal limitations upon child responses during the *acquisition* of a discrimination. It is possible that this procedure might be effective for maintaining optimal preattending behaviors in children but might not be effective for obtaining correct responding during discrimination acquisition. Temporal limitations imposed during discrimination acquisition might have different or even detrimental effects, and these effects might be different according to the individual capabilities of the children involved.

It was determined that before answering the questions regarding the effects of temporal limitations on discrimination acquisition, it would be necessary to replicate the results of Busby and LeBlanc (1972) with current tasks, procedures, and settings.

Purpose. The purpose of this study was to compare error patterns under conditions of short temporal limitations upon responding (4 seconds) with longer limitations on responding (12 seconds and 16 seconds).

Subjects/Setting. The subjects were 16 preschool children from the Department of Human Development, Child Development Laboratory. Sessions were conducted in a small room with a table and chairs to accommodate a group of four subjects and a teacher.

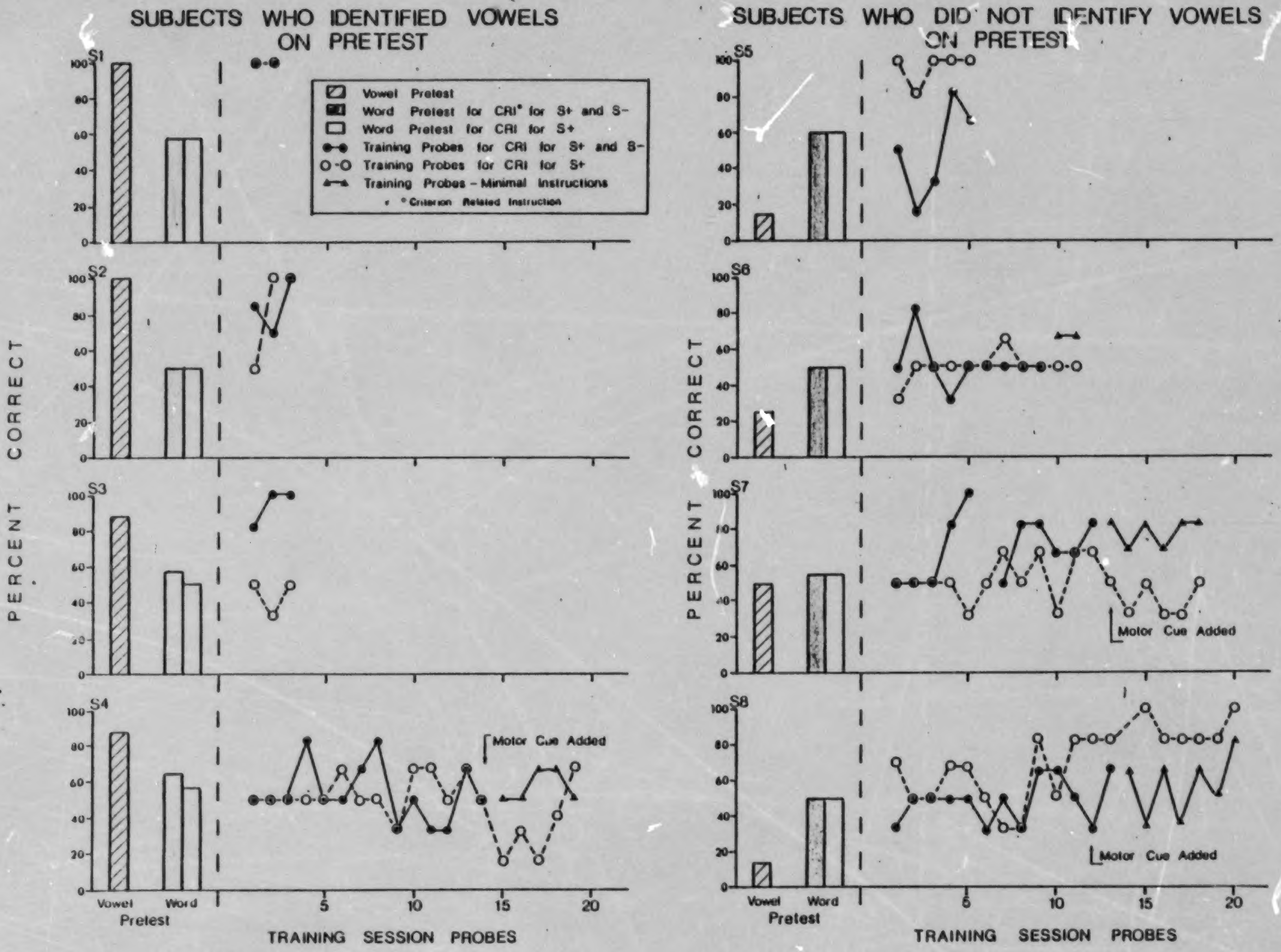

SUBJECTS WHO IDENTIFIED VOWELS ON PRETEST
SUBJECTS WHO DID NOT IDENTIFY VOWELS ON PRETEST
S1
S2
S3
S4
S5
S6
S7
S8
PERCENT CORRECT
0
20
40
60
80
100
▨ Vowel Pretest
▩ Word Pretest for CRI* for S+ and S−
☐ Word Pretest for CRI for S+
●-● Training Probes for CRI for S+ and S−
○-○ Training Probes for CRI for S+
▲-▲ Training Probes – Minimal Instructions
* Criterion Related Instruction
Motor Cue Added
Vowel
Word
Pretest
5
10
15
20
TRAINING SESSION PROBES

Figure 61

Data Collection. Observers using stop watches recorded whether or not the children responded to teacher instructions within the prescribed temporal limitation.

Experimental Design/Procedures. The design was a reversal design in which one condition had a 16- or 12-second time limit and the other a 4-second limit on each subject's responses to the stimuli presented by the teacher. Trials on practice tasks were individually presented to the children in a match-to-sample format. From a stack of cards, one was held up and the experimenter said, "I'm going to look at my card and ask who has that picture. If you see the picture on your page (in an individual notebook for each subject in the group), put your finger on it. Only point when you have the picture I ask for. When you point to the right picture, you get my card to stick on top of your picture." Once the children understood the format of training, the instructions were simply, "Who has this picture?"

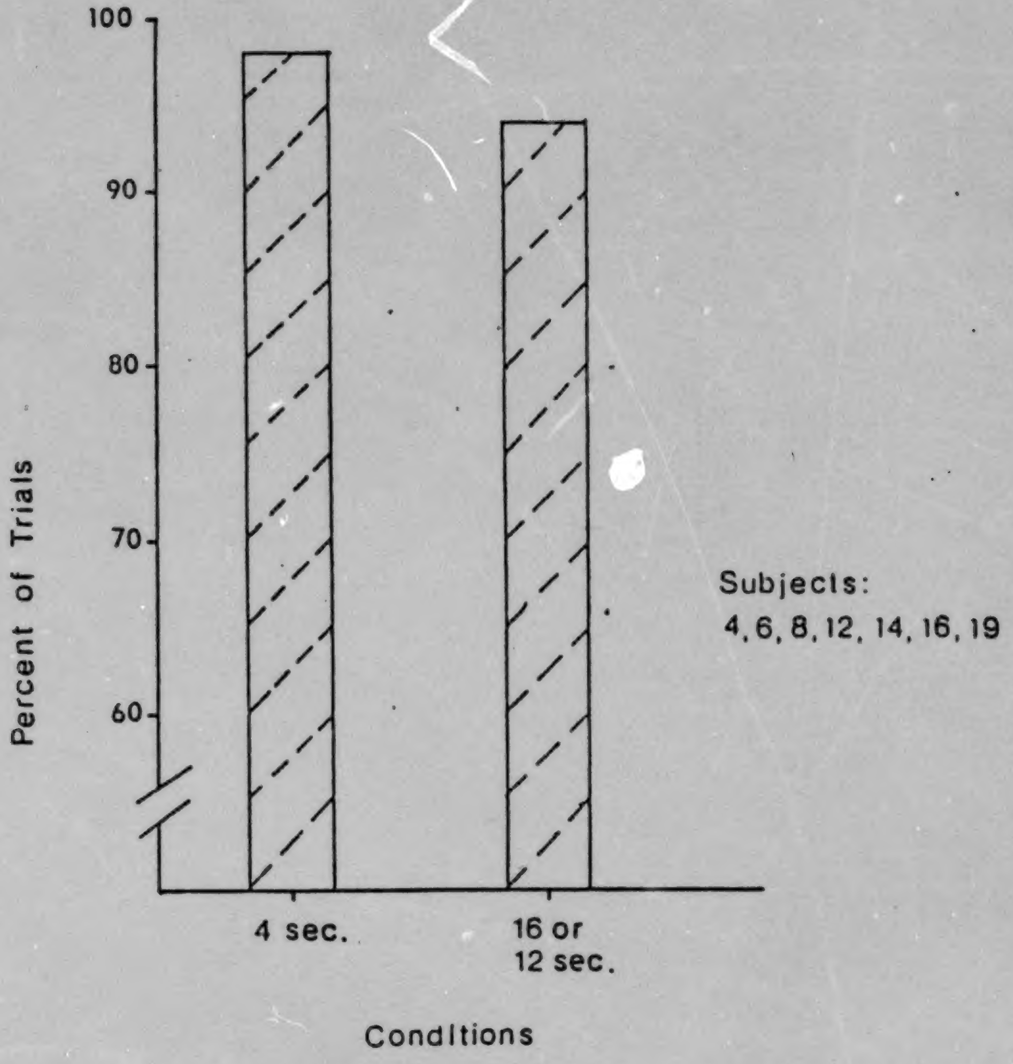
Order of presentation of the conditions was counterbalanced across four groups of subjects. To control for pacing of sessions, the experimenter waited 12 seconds (or 16 seconds) between giving the initial instruction and moving to the next trial for Groups 1 and 3. For Groups 2 and 4, the experimenter proceeded to the next trial as soon as a response was made and the appropriate feedback given.

Results. Figure 62 indicates that the percent of trials responded to within 16 or 12 seconds and those responded to within 4 seconds did not differ considerably. There did appear to be a presentation order effect (Figure 63). If subjects were exposed to the 12- or 16-second temporal limitations first and then the 4-second condition, a return to the 12- or 16-second condition indicated improved responding for that condition. This was not the case for subjects who were first exposed to the 4-second condition.

Discussion. The differences in response latencies obtained by Busby and LeBlanc (1972) were not replicated. To determine if the differences were due to the length of experimental sessions, the comparisons of 12 and 16 seconds were made. However, no systematic differences evolved from this comparison and thus in this analysis the groups with the two different, longer temporal limitations were combined. One reason for the discrepancy between the current and prior research could be that the pacing was more constant in the current study. Busby and LeBlanc imposed no time limit in their longer condition and this one was limited to 12 or 16 seconds. Additionally, Busby and LeBlanc repeated an instruction until the subjects responded in the no time limit condition. In contrast, only one instruction per trial was presented in both conditions of the present research.

## STUDY 5: A COMPARISON OF 4-SECOND AND 12-SECOND LIMITATIONS ON RESPONDING ON DISCRIMINATION ACQUISITION
(PIs: LeBlanc, Kramer, and Ruggles)

Despite the discrepancies between the previously described research and that of Busby and LeBlanc (1972), it was decided that differences might evolve when temporal limitations are placed upon responding during discrimination acquisition.



Percent of Trials Responded to Within Four Seconds

Figure 62

Percent of Trials Responded to Within Four Seconds

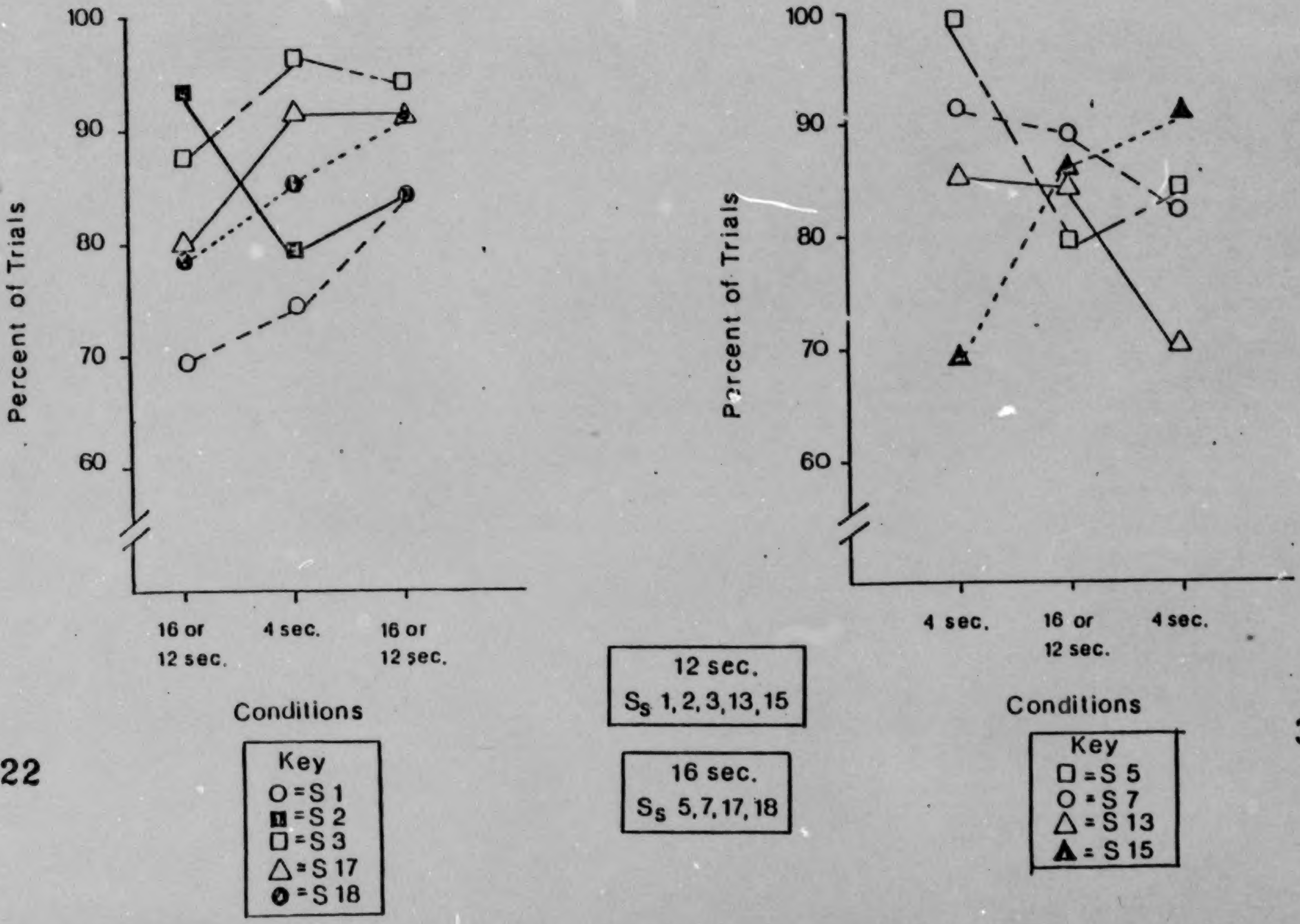


Figure 63

Purpose. The purpose of this present study was to compare discrimination acquisition under conditions of 4-second limitations on responding with acquisition under conditions of 12-second limitations on responding.

Subjects/Setting. The subjects were four preschool children (age 4 to 5 years) from the Department of Human Development, Child Development Laboratory classrooms. Sessions were conducted in a small room with a table and chairs to accommodate a group of four subjects and a teacher.

Data Collection. Observers using stop watches recorded whether or not the children responded to teacher instructions within the prescribed temporal limitations.

Experimental Design/Procedures. Procedures were similar to those implemented in the previous study. The stimuli were Japanese Kanji symbols which the children responded to receptively as the experimenter labeled them. Each child was taught a different three-choice visual discrimination from a notebook in which the stimuli to be learned by that child were displayed. Across four experimental conditions, time limits alternated between 4 and 12 seconds (that is, the time limit in the first condition was 4 seconds, the limit in the second condition was 12 seconds, etc.). For each condition a new set of stimuli were taught to each child.

Results. There were essentially no differences in acquisition of the discriminations in the 4- and 12-second conditions, for all four subjects.

Discussion. For this type of receptive response to a verbal label task, it appears that imposing time limits on responding has little or no effect. For tasks requiring a productive response (i.e., the verbalization of the label), it is quite possible that differences would be obtained because acquisition of productive response discriminations is much more difficult than acquisition of receptive response discriminations.

## STUDY 6: THE COMPARATIVE EFFECTS OF FORWARD AND BACKWARD CHAINING TEACHING PROCEDURES UPON LEARNING SEQUENCES OF SYMBOLS

(PIs: LeBlanc, Drake, and Ruggles)

To operate effectively in today's environment, the ability to remember sequences of numbers, letters, and/or symbols becomes increasingly important. This ability will become even more important as our society becomes increasingly computerized. Children with learning difficulties can frequently be identified because they lack the skill to recall even short sequences of symbols. For example, one of the indicators of reduced capacity, as measured by both the Stanford-Binet and the Wechsler IQ tests, is digit span. Thus, it becomes important to determine how one might most effectively teach this behavior to young and at-risk children.

Authors of self-help behavior modification texts often suggest the use of backward chaining as an effective procedure for training complex behavior chains. However, there is a paucity of information in the literature regarding the optimal method for teaching chains.

*Purpose*. The purpose of this research was to compare forward and backward chaining to determine which is more efficient for teaching numerical sequences of seven numbers (the number of digits in typical telephone numbers).

*Subjects/Setting*. The subjects were four preschool children, ranging in age from 3.2 to 5 years of age and who attended the Department of Human Development, Child Development Laboratory classrooms. Sessions were conducted in a small room in which the children were individually taught.

*Data Collection*. The data were electromechanically obtained and reflected the correct and incorrect responses for the children.

*Experimental Design/Procedures*. The stimulus materials consisted of a series of cards (35 x 7.5 cm) on which one to seven numbers are displayed. To teach a seven digit sequence with backward chaining, the first card in the series presented had only the last digit of the seven digit number present, the next card had the last two digits present, etc., until all seven digits appeared on the last card. The forward chaining stimuli included the appearance of only the first digit of the seven digit number present, the next card included the first two digits, etc., until all seven digits were present on the last card. These cards were placed on an apparatus consisting of a panel of seven buttons, numbered in sequence from left to right, one to seven. Training consisted of a child looking at the current card and pushing buttons according to the numbers appearing on the card. Correct responses were praised and resulted in the receipt of a token exchangeable for a small toy. Incorrect responses resulted in a correction procedure pointing out the correct response. Probes, or tests of training, consisted of the experimenter asking the child to push the sequence learned to that point on the buttons without the aid of the card. All subjects served as their own control and all subjects received both types of training, i.e., forward and backward chaining training, on two different number sequences. Both types of training were presented to each child daily.

*Results*. There were no differences between acquisition of the number sequences resulting from the two types of training. There was, however, much variability in acquisition across subjects.

*Discussion*. It was felt that the lack of differential responding between the two types of training could have been a result of low motivation since the subjects required much time to learn the sequences, no matter what type of training was imposed.

### STUDY 7: A COMPARISON OF BACKWARD AND FORWARD CHAINING OF NUMERICAL SEQUENCES WITH ENHANCED MOTIVATION

(PIs: LeBlanc, Drake, and Ruggles)

There were no clear indications in the previous experiment that either backward or forward chaining was a preferable procedure for teaching numerical sequences. It was felt, however, that the subjects were not operating under optimal motivational conditions.

Purpose. The purpose of this research was to compare backward and forward chaining procedures for teaching seven digit numerical sequences under optimal motivational conditions.

Subjects/Setting. The subjects were four preschool children, ranging in age from 3.4 to 5 years of age and who attended the Department of Human Development, Child Development Laboratory classrooms. Sessions were conducted in a small room in which the children were individually taught.

Data Collection. The data for this experiment were electromechanically controlled and the experimenter could control stimulus presentation and reinforcement via an electromechanical relay rack.

Experimental Design/Procedures. The procedures for this study were essentially the same as those for the immediately preceding experiment. There was, however, an addition of a piece of equipment that could separately light seven different zones of a Mickey Mouse picture. These zones were programmed to light up as the subjects pushed the numbered buttons in the sequence corresponding to the number being taught.

Results. There appeared to be a slightly faster acquisition for most subjects under conditions of forward chaining. Acquisition was not as variable for these subjects as it was for those subjects in the previous study for whom there was no added environmental feedback in the form of the lighted Mickey Mouse face.

Discussion. Although acquisition was slightly better with forward chaining, the task may have been too difficult for the children, thus masking any substantial differences that might have occurred.

### STUDY 8: A COMPARISON OF FORWARD AND BACKWARD CHAINING DURING A BUTTON-PRESS SEQUENCING TASK

(PIs: LeBlanc, Drake, and Ruggles)

The first experiment in this comparison indicated there were no essential differences between the effects of backward and forward chaining procedures for teaching seven-digit number sequences. The second experiment indicated a slight advantage for the forward chaining procedure under enhanced motivational conditions. These latter results, however, were minimally different. It is possible that the format of the experiment (looking at the Mickey Mouse face, which was the lighted feedback apparatus, and back to the buttons--while trying to remember a number sequence) was too distracting for children and that for some children the task was too simple and, thus, no differences occurred.

Purpose. The purpose of this experiment was to compare backward and forward chaining procedures for teaching a chain of motor responses corresponding to a prescribed series of button presses. As in previous experiments, the apparatus contained seven buttons in the row, but the subject had to remember the sequence of positions rather than a sequence of numbers.

*Subjects/Setting*. The subjects were four preschool children who attended classes in the Department of Human Development, Child Development Laboratory. Sessions were conducted in a small room in which the children were individually taught.

*Data Collection*. Correct and incorrect responses, presentations of stimuli, and presentations of reinforcers (marbles) were controlled by the experimenter through electromechanical equipment on a relay rack.

*Experimental Design/Procedures*. The apparatus included seven blank buttons with a green pilot light over each button. Reinforcement consisted of lighting parts of a Mickey Mouse face. In the backward chain, the entire face illuminated at the end of each correct trial; in the forward chain the number of parts which matched the numbers of buttons pressed by the subject on a given trial illuminated. The sequence of button presses was gradually increased starting with one press, then two, then three, etc. The experimenter modelled the correct response and said, "I press this button(s), now you press the same button(s)." When multiple buttons were to be pressed, the instructions were, "I press this button, and then this one, and then this one," etc. For one group of subjects, a correction procedure involved backing up to the previous number of buttons when an error was made. For another group of subjects, the backup procedure was eliminated.

*Results*. There were no systematic differences between the two conditions. In addition, most subjects had difficulty learning the task.

*Discussion*. There were no differences in the effects of backward and forward chaining on the acquisition of a motoric sequence of responding, possibly because the task was too difficult for the children. All children had difficulty learning the task, no matter which of the procedures was used.

### STUDY 9: A COMPARISON OF CHAINING COLORS UNDER CONDITIONS OF BACKWARD AND FORWARD TRAINING PROCEDURES

(PIs: LeBlanc, Drake, Ruggles)

Previous research indicated that under conditions of enhanced motivation, acquisition of seven-digit numeral sequences appeared to be slightly faster with forward chaining than with backward chaining teaching procedures. To enhance motivation in this prior research, parts of a Mickey Mouse face would light up in different colors as each correct response in the chain occurred. Although forward chaining procedures resulted in slightly faster acquisition of the total chain, it was decided that the task and the reinforcement mechanism were possibly interacting and thus reducing the differential effects of the two procedures. That is, the children, though motivated by the Mickey Mouse face, were distracted by the lighting of the colors and this distraction resulted in their forgetting the numbers involved in the sequence. One method for eliminating this interaction would be to have the children learn a motor sequence that was not attached to a particular numerical sequence.

Purpose. The purpose of this study was to compare backward and forward chaining procedures for teaching sequences of motor responses.

Subjects/Setting. Subjects were eight preschool children, ages 3.6 to 5 years, who attended the Department of Human Development, Child Development Laboratory preschool classes. Sessions were conducted in a small room in which the children were individually taught.

Data Collection. Correct and incorrect responses, presentations of stimuli and presentations of reinforcers (marbles) were controlled by the experimenter through electromechanical equipment on a relay rack.

Experimental Design/Procedures. The seven buttons on the apparatus used in the three previous experiments were now colored to correspond to the lights on the Mickey Mouse face. The experimenter instructed the child to "point to this color" in a backward sequence on the first trial. On the second trial, the child was asked to "point to this and now this color," etc., until all seven colors were pushed in the order to be learned. Correct response resulted in the corresponding colored lights illuminating on the Mickey Mouse face. The backward chaining procedure differed only in the sequence in which the colors were requested, e.g., push this (blue) on the first trial; push this and this (yellow and blue) on the second trial, etc., until all seven colors used in this sequence were pushed. Probes consisted of the experimenter requesting the subject to push the buttons in the order being learned.

Results. Backward chaining resulted in slightly faster learning than forward chaining. Acquisition was not variable across subjects.

Discussion. Perhaps forward chaining is slightly better for teaching numerical sequencing, and backward chaining is better for teaching motor sequencing. These mixed results suggest that task differences (motor vs. nonmotor, number vs. nonnumber) are important considerations for using one or the other procedure. It appears that neither backward nor forward chaining should be generally favored for use in applied behavior analysis. It is possible that with simple motor tasks, such as putting on a sweater, backward chaining might be more effective. Although it is frequently stated in beginning behavior modification texts that backward chaining is the better procedure, there are no empirical data to support that contention. Until such data are available, caution should be exercised when recommending either backward or forward chaining.

### STUDY 10: A COMPARISON OF MASSED AND INTERMIXED STIMULUS PRESENTATIONS (PIs: LeBlanc, Britten, and Ruggles)

Another factor in optimal teaching environments is the presentation sequences of stimuli. For example, is it better for a child to learn only one label for one object at a time or to learn two different labels for two objects simultaneously?

Purpose. The purpose of this research was to compare massed and intermixed presentations of stimulus materials in discrimination acquisition of children.

Subjects/Settings. The subjects were 10 normal children from the Department of Human Development, Child Development Laboratory classrooms. Their mean age was 4 years-6 months. Sessions were conducted individually in small rooms close to the classrooms of the subjects.

Data Collection. Correct and incorrect responding were recorded by the experimenter and a reliability observer on predesigned recording sheets.

Experimental Design/Procedures. Massed training was defined as training stimulus A for 10 consecutive trials, then training stimulus B for 10 trials. Intermixed stimulus presentations consisted of training stimulus A and stimulus B in a systematically intermixed, but not alternating, sequence for 20 trials. In both types of training, both stimuli were present during each trial. The materials were two sets of three Kanji (Japanese) symbols. Recognition probes, including stimuli taught by intermixed and massed presentations, were implemented at the beginning of each experimental session. Training with intermixed and massed stimuli was presented on alternate days.

Results. Figure 64 indicates that eight of the 10 children learned quicker on intermixed training, one learned faster on massed, and one learned equally well with both procedures. However, fewer errors were made by subjects on massed training than on intermixed training.

Discussion. Intermixed training was clearly more effective than massed. Greeno (1964) also found the intermixed training was more effective and concluded this was possibly the case because the children had more opportunity to compare the stimuli in the intermixed training. The task used by Greeno involved the presentation of only one stimulus at a time. In the present research, Greeno's conclusion regarding the basis for his results is not supported, because both stimuli were present during both massed and intermixed trials. However, subjects were not really required to listen to the label provided for stimuli in massed training, because they only had to point to the one previously reinforced in order to be correct. It might be concluded that intermixed training was more effective for this latter reason.

## STUDY 11: A COMPARISON OF MASSED AND INTERMIXED STIMULUS PRESENTATIONS WITH DIFFICULT-TO-TEACH SUBJECTS

(PIs: LeBlanc, Britten, and Ruggles)

Since the comparison of massed and intermixed stimulus presentations indicated that intermixed presentations result in more efficient learning with normal preschool children, it was decided to investigate this phenomenon with children who have demonstrated learning difficulties.

COMPARISON OF THE NUMBER OF SUBJECTS REACHING PRESESSION PROBE CRITERION IN INTERMIXED AND MASSED TRAINING

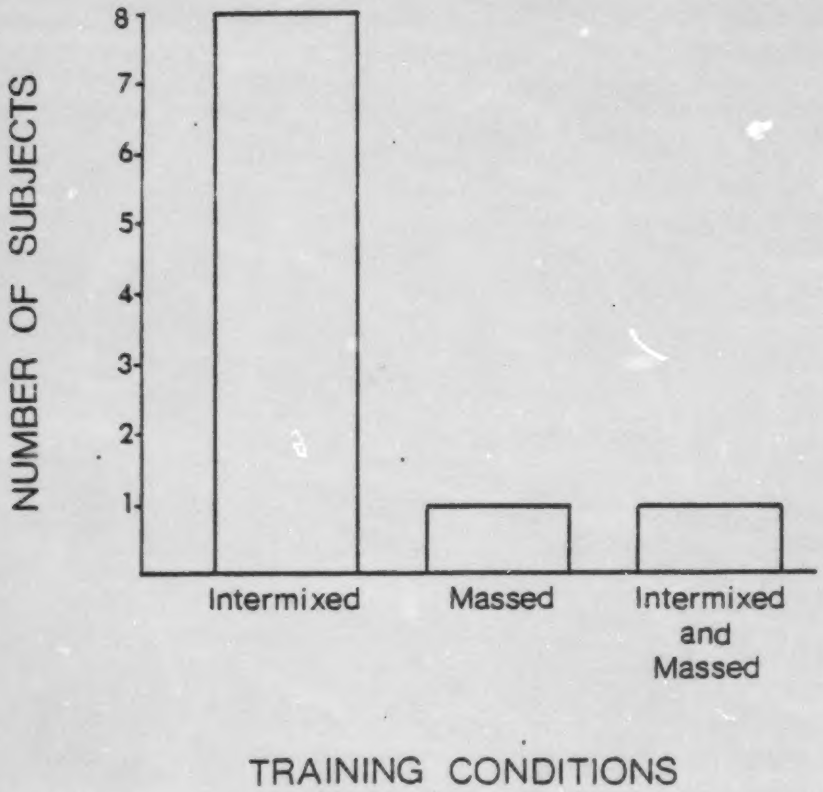


Figure 64

Purpose. The purpose of this study was to compare the effects of massed and intermixed stimulus presentations on discrimination learning of difficult-to-teach subjects.

Subjects/Setting. The subjects were four children from the Child Development Laboratory who were reported by the teachers as children who display some type of learning disability, such as attentional deficits or delayed speech. The subjects' mean age was 5 years-9 months. Sessions were individually conducted in small rooms close to the classrooms of the subjects.

Data Collection. Correct and incorrect responding were recorded by the experimenter and a reliability observer on predesigned recording sheets.

Experimental Design/Procedures. The stimulus materials consisted of two sets of three Kanji symbols drawn in black and centered on unlined 7.5 cm x 7.5 cm index cards. The stimuli were presented in a three-ring notebook. Three stimuli for each trial were placed on a single 22 cm x 28 cm page enclosed in clear plastic. A discrimination between two of the three stimuli was taught and tested; the third stimulus served as a distractor. Massed and intermixed training procedures were the same as in the previous study. Recognition tests, including stimuli taught by intermixed and massed presentations, were implemented before training at the beginning of each experimental session. Training with intermixed and massed stimuli was conducted on alternate days.

Results. Three of the four subjects learned more rapidly with intermixed stimulus presentations. These results are similar to those obtained with normal subjects in the prior experiment.

Discussion. The overall results of this study indicate that for children with learning problems, as with normal children, intermixed training was more effective than massed for facilitating acquisition of visual discrimination. As the study progressed, it became apparent that certain response patterns were created which were indicative of the attention required in each type of training. For example, receptive responses were required of the subjects for both intermixed and massed training conditions. Since massed instructions were the same for 10 consecutive trials, subjects had only to look for the symbol which was previously reinforced but did not have to listen to each instruction in order to respond correctly. Anecdotal data support this conclusion, as many children verbalized or pointed to the correct symbol before the experimenter gave an instruction. Children also made statements such as, "I can point to the right one before you tell me." In addition, on the first few massed training trials for the second symbol, many subjects verbally responded or pointed to the previously trained symbol. During intermixed training the children not only had to look at the symbols but also had to listen to the experimenter's instruction in order to make a correct response. Thus, it appears that the association between a verbal label and a stimulus was not practiced in massed training. In contrast, practice with such associations did occur in intermixed training.

## STUDY 12: TEACHER IMPLEMENTED OPTIMAL TEACHING ASSESSMENT STRATEGIES FOR MODIFYING NONCOMPLIANCE TO INSTRUCTIONS DURING PREACADEMIC LEARNING

(PIs: LeBlanc, Etzel, Goldstein, Cooper, Drake, Hass, and Ruggles)

Teachers find that sometimes, rather than following an instruction, children will react with inappropriate behavior which may delay or preclude compliance to that instruction. Typically, the behavior modification procedures designed to reduce these behaviors are extinction and/or time-out. However, as indicated by Plummer, Baer, and LeBlanc (1970), if children find the work in classrooms to be punishing or aversive, then time-out or extinction may provide escape from the teaching situation. The research by Plummer, et al., indicated an alternative procedure for teachers to use if such is the case: that instructions continue to be delivered to the child and escape from the learning situation not be allowed through time-out. The procedure was labelled, "paced instructions".

Purpose. The purpose of this research was to further analyze the effects of paced instructions when time-out was not effective and to determine some of the conditions which might enhance its effectiveness. In addition, procedures were sought that could be immediately effective in a classroom situation.

Subject/Setting. The subject was a 4.1 year old child who was referred to a classroom in the Department of Human Development Child Development Laboratory, that dealt with children with problems. Disruptive and destructive behaviors of the child often precluded compliance to teacher instructions. Conceptual deficits also contributed to the lack of compliance, although not as heavily. The research was conducted in a small room adjacent to the preschool classrooms. Sessions were 30 minutes in length.

Data Collection. Data were recorded four days a week during the first 15 minutes of the classroom preacademic period by a trained observer using a continuous 10-sec. interval recording procedure.

Experimental Design/Procedures. The design incorporated several procedures in which teacher behavior contingent on subject compliance or inappropriate behavior varied as follows: Baseline: The teacher engaged the subject in various preschool tasks, using whatever methods seemed appropriate, including time-out. Paced Instructions: The teacher praised compliance but ignored inappropriate behavior by staring at task materials and repeating task instructions every 5 sec. in the same tone as the original instruction. Contingent Reprimands Plus Paced Instructions: The teacher praised compliance but, contingent upon inappropriate child behavior, reprimanded and physically put the child through the appropriate behavior. Paced instructions were maintained, contingent upon those subject responses that were neither compliant nor inappropriate.

Results. Compliance was highest in the Contingent Reprimands plus Paced Instructions condition and lowest in the Paced Instructions condition (Figure 65). The Contingent Reprimands plus Paced Instructions condition also had the greatest effect on decreasing the frequency of inappropriate behavior. Inappropriate behavior was highest in the Paced Instructions condition.

Discussion. Paced instructions paired with contingent reprimands and physical guidance was an effective alternative when time-out and paced instructions alone were not sufficient for reducing inappropriate behavior and increasing appropriate behavior. Unlike the research of Plummer, et al., the paced instructions procedure was instituted as a consequence for inappropriate behavior and appeared to act as a positive reinforcer, increasing inappropriate behavior. The reprimand and put-through procedures served as punishing consequences for inappropriate behavior and thus decreased these behaviors, providing opportunities for teacher attention to be applied contingently to appropriate behavior.

## STUDY 13: TEACHER-IMPLEMENTED OPTIMAL TEACHING ASSESSMENT STRATEGIES FOR PREACADEMIC LEARNING: INSTRUCTIONAL CONTROL OF MOTOR BEHAVIOR

(PIs: LeBlanc, Etzel, Kleinke, Cooper, and Ruggles)

Radgowski, et al. (1978), demonstrated that delayed feedback procedures could be effective for teaching receptive and productive discriminations in a foreign language to normal preschool children in individual and/or group settings. It was decided that the procedure was simple enough and appeared to be effective enough to use with a child who was experiencing difficulty following instructions and who was severely language delayed.

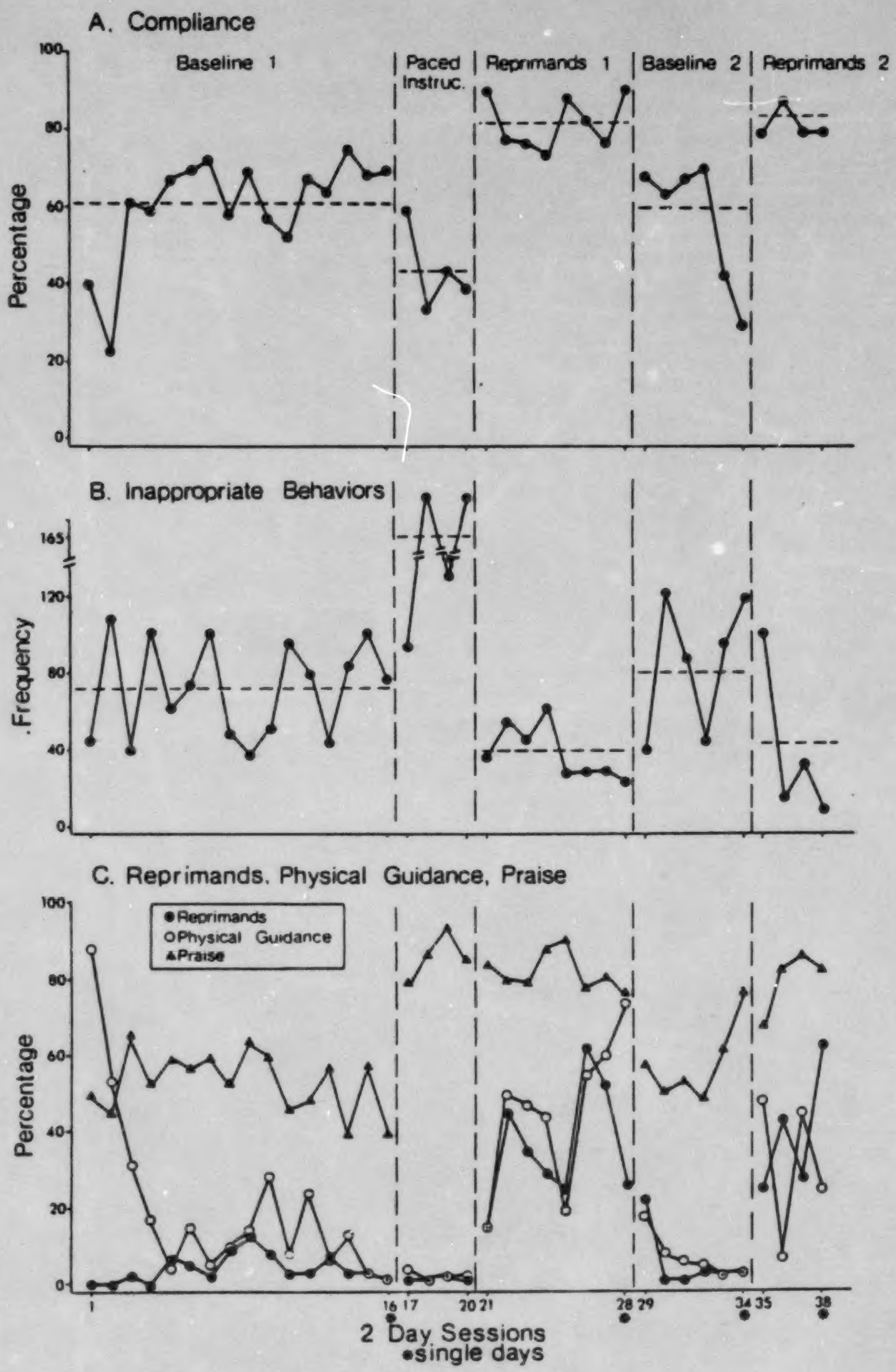
Purpose. The purpose of this study was to examine the effects of delayed feedback on a child's acquisition of imitative responding and instruction-following. It was further proposed that methods be develed to optimize delayed feedback as a teaching procedure.

Subject/Setting. The subject was a 4-year-old language delayed male child enrolled in a Child Development Laboratory preschool classroom. Sessions were conducted by the teacher in the classroom and in a small research room which contained a table and chairs.

Data Collection. Baseline data were recorded on compliance to verbal instructions and imitation of four small-motor, four large-motor, and four verbal responses by an observer in continuous 10-sec. interval recording.

Experimental Design/Procedures. In the first condition, imitation of two small-motor behaviors and following instructions for one were taught with a delayed put-through (feedback) procedure. After several sessions, during which there was no evidence that learning was occurring, a combined procedure of gradually delayed put-through and fading of physical prompts was implemented to increase compliance to instructions for two small-motor behaviors. This second procedure was systematically applied across the other behaviors.

## RESULTS: STUDY 12



A. Compliance

B. Inappropriate Behaviors

C. Reprimands, Physical Guidance, Praise

FIGURE 65

*Results*. All the behaviors, for which the combined procedure of gradually delayed put-through and fading of physical prompts was utilized, were acquired. There was some generalization from instruction following to imitation and vice versa. A limited amount of generalization occurred to untrained behaviors within behavioral classes. Little generalization, however, occurred across behavioral classes.

*Discussion*. The addition of the fading of physical prompts to the delayed put-through (feedback) procedure was sufficient to bring about the desired behaviors of this child. It is an easily implemented procedure and one which teachers do not seem reluctant to use. In previous research (Touchette, 1971; Radgowski, Allen, Ruggles, Schilmoeller, & LeBlanc, 1978; Radgowski, Allen, Ruggles, & LeBlanc, 1978), the delayed feedback procedure was used to effect transfer of control from one stimulus to another. The method of gradually delaying the feedback until the child responds before feedback was sufficient for transferring stimulus control. However, it apparently is not sufficient for shaping behavior which is not currently in the child's repertoire. The addition of fading of physical prompts to the gradually delayed feedback procedure appears to be sufficient for developing new behaviors.

## STUDY 14: TEACHER-IMPLEMENTED OPTIMAL TEACHING ASSESSMENT STRATEGIES: PRESCRIPTIVE PROCEDURES BASED ON ENVIRONMENTAL ASSESSMENT

(PIs: LeBlanc, Etzel, Baxter, and Ruggles)

One method of determining the best prescriptive techniques to use with children experiencing learning difficulties in the classroom is to assess the entire environment surrounding the learning situation. Following the recommendation of Etzel and LeBlanc (1979), the goal should be to develop the simplest treatment alternative subsequent to analyzing the motivational and instructional environment in which the child is learning. In order to do this, research on assessment and instructional procedures must be integrated.

*Purpose*. The purpose of this study was to analyze the learning environment of a child for purposes of implementing procedures to overcome the child's severe learning difficulties and a lack of instructional control.

*Subject/Setting*. The subject was a 4 year-old male enrolled in the Department of Human Development, Child Development Laboratory classroom. The child refused to follow teacher instructions, wandered around the room disturbing other children and teachers, mouthed materials, and threw materials.

*Data Collection*. Data were recorded daily on a Datamyte Data Collector while the subject completed two to three of the tasks presented. A continuous 10-sec. interval recording method was used. The recorded child behavior included inappropriate head orientation, inappropriate hand placement, inappropriate sitting, inappropriate verbalizations, and inappropriate use of materials. Not working was recorded anytime the child was not working toward task completion for 5 or more seconds of a 10-sec. interval.

Experimental Design/Procedures. After the implementation of several unsuccessful and one successful condition, a reversal design was used to demonstrate experimental control in this study. The conditions were Baseline, Contingent Attention, Paced Instructions, Extinction, and Combined Procedures. It was only the combination of procedures that was effective. This combination included putting the child's chair close to the table, instructing the child to return if he left the chair, giving a second instruction if he did not comply with the first, physically returning the child to the chair if the child did not comply with the second instruction, and removing the child to a time-out room located near the table if two physical assistances did not result in the child remaining in the chair. Temporal efficiency was improved by putting the child's materials in place on the table before the preacademic period, the length and difficulty of the tasks was shortened or decreased, and easy tasks, such as small puzzles or a pencil and paper, were given to the child to work on between regularly planned tasks. The teacher gave only short immediate praise and did not elaborate on why the task was correct; further, the teacher exhibited more animation in instructing and praising and less animation or enthusiasm when the child was incorrect.

Results. Neither increased praise nor paced instructions was sufficient to decrease the child's off-task behavior. The combined procedures did, however, result in decreases in these behaviors (Figure 66).

Discussion. The combination of procedures included a number of components that were not previously implemented in the teaching situation. Perhaps the general increase in activity level in these procedures contributed to their success because the teacher's activities and behaviors were more discriminable, and thus success was achieved.

## STUDY 15: IMPLEMENTING TEACHING ASSESSMENT STRATEGIES IN GROUP SETTINGS

(PIs: LeBlanc, Ruggles and Kramer)

Instructional variables from which the prescriptions are derived will be implemented in groups of young children rather than in one-to-one situations. This is the most important aspect of the proposed research because it allows the outcomes to be functional for the classroom teacher. Study 8 (Teacher's Use of Temporal Limitations in Discrimination Learning) and Study 10 (Effects of Delayed Feedback on Discrimination Learning) were conducted with groups of children. This research and that described by Wilson, Allen, Ruggles, and LeBlanc (1978) indicated that teaching children in groups can result in not only more efficient use of teacher time but also in faster discrimination acquisition on the part of the children being taught.

One measure of the effectiveness of group teaching is what children learn from each other in a group learning setting. Sidman and Cresson (1973) taught retarded subjects the relationship between a spoken word and a picture, as well as the relationship between the same spoken word and that word printed. For example, the children pointed to the picture of the cow when the experimenter said "cow" and they learned to

Subject 1

NOT ATTENDING AND NOT WORKING

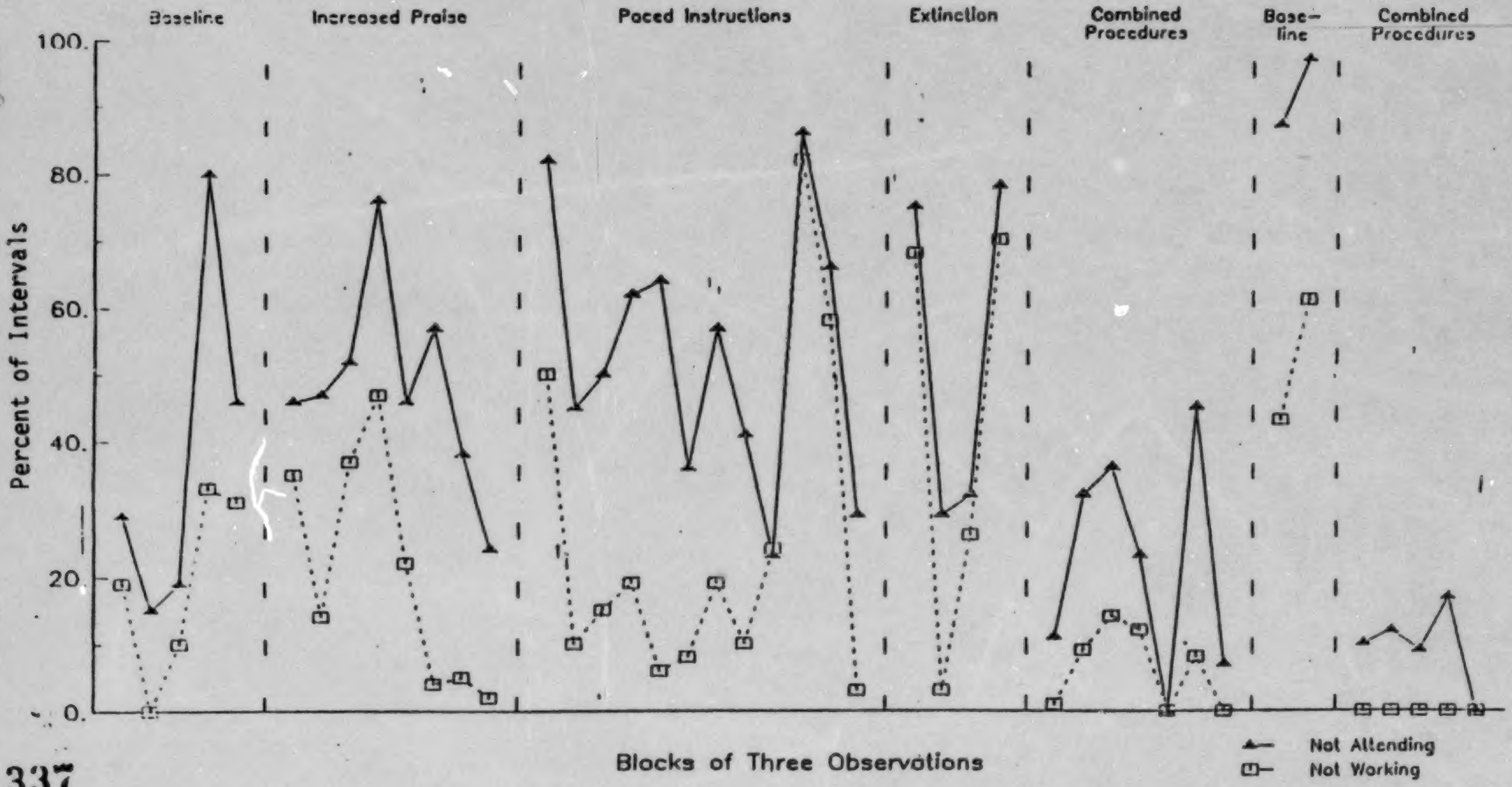


Figure 66

point to the printed word, cow, when the experimenter said "cow". They found that, although the subjects were never taught the correspondence between the printed word and the picture, they had learned it.

Purpose. The purpose of this research was to examine the mediation paradigm with a group of children. Some members were to be taught only one association in the triad and others the second. The experimental question was: Would all children learn the final correspondence?

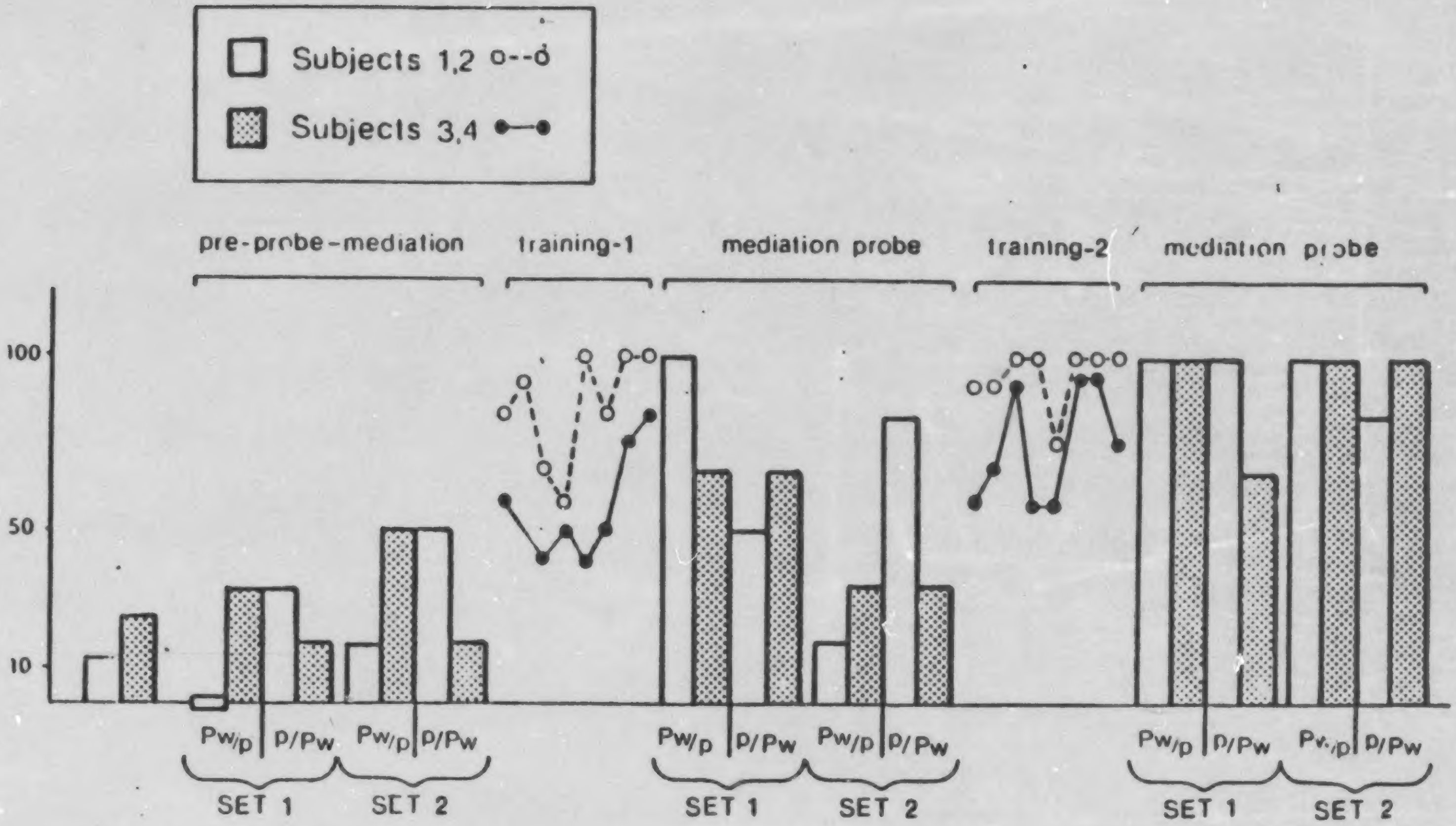
Subjects/Setting. The subjects were four preschool children, ages 3.8 to 4.9, who attended the Department of Human Development, Child Development Laboratory. The subjects were taught in a group in a small room close to their classrooms. The room was sufficiently large to accommodate a table and chairs for the four children and the experimenter.

Data Collection. Correct and incorrect responding was recorded by the experimenter and a reliability observer on a predesigned recording sheet.

Experimental Design/Procedures. Two children in a group of four preschool children were taught the relationship between a spoken word and a picture; the other two were taught the relationship between the same spoken word and that word in printed form. All children were tested on the relationship of the printed word to the picture. The stimuli were international agricultural symbols. During training, the children were presented with three stimuli and asked to point to one of them (for example, point to silo). Training for pointing to the printed word was the same for all subjects. The subjects were then presented a match-to-sample task in which they were required to point to the stimulus on the bottom which had the same meaning as the one on top. On half of the test trials the printed word appeared at the top and the picture at the bottom, and for the other half the picture was the sample and the printed word was the match.

Results. As can be seen in Figure 67, by comparing the first group of bars for Sets 1 and 2 with the last group of bars for the same sets, all children learned the third correspondence. (The middle set of bars indicates incomplete learning due to experimental control techniques which were incorporated.)

Discussion. It was concluded that children can learn one relationship through direct training and a second through indirect observational learning, and subsequently be able to integrate the two relationships into a third correspondence. Although the finding is preliminary, it is anticipated that continued research of this nature will reveal additional principles for teaching children in groups.



Subjects 1,2 ○--○
Subjects 3,4 ●—●
pre-probe-mediation
training-1
mediation probe
training-2
mediation probe
Percent Correct
100
50
10
Pw/p
p/Pw
Pw/p
p/Pw
SET 1
SET 2
Pw/p
p/Pw
Pw/p
p/Pw
SET 1
SET 2
Pw/p
p/Pw
Pw/p
p/Pw
SET 1
SET 2

Figure 67

## STUDY 16: A COMPARISON OF EFFECTS OF PROGRESSIVELY DELAYED FEEDBACK UPON DISCRIMINATION ACQUISITION IN GROUP AND INDIVIDUAL LEARNING

(PIs: LeBlanc, Radgowski, Allen, Ruggles, and Schilmoeller)

It was demonstrated by Radgowski, Allen, Schilmoeller, Ruggles, and LeBlanc (1978a) that progressively delayed feedback could be used to teach the discriminations involved in simple French phrases to preschool children. This procedure was used with individual children, however, and thus required much teacher time to implement. Because this procedure had been successfully used with many types of populations, including the severely retarded, it was thought it could perhaps become a more useful teaching technique if it could be successfully implemented in a group of children.

Purpose. The purpose of this research was to compare the progressively delayed feedback procedure across group and individual settings.

Subjects/Setting. Eight preschool children from the Department of Human Development, Child Development Laboratory classrooms served as subjects. Children were either taught in a small room individually or in a group of four in the classroom in which they were enrolled.

Data Collection. Observers recorded correct and incorrect responding and the latency of those responses.

Experimental Design/Procedures. Four subjects in a group were taught receptive responding and productive responding to instructions given in French; four subjects were taught in a group and four individually. There were two methods of training responding: receptively and productively. In receptive teaching, the teacher initially said, "Roll the ball" in French and immediately the teacher modelled rolling the ball. Then the child rolled the ball. With each succeeding trial involving that phrase (several phrases were taught simultaneously), the feedback which the teacher provided by rolling the ball was delayed a few seconds. The child always correctly responded by imitating the feedback modelled by the teacher until, at some point, the child did not wait for the model but rather "beat the teacher". That is, the child responded before the teacher modelled the correct response. The productive teaching was similar, but the teacher demonstrated first by rolling the ball and then said, "Roll the ball" in French after the teacher model. Ultimately, as the delay of the verbal feedback grew longer, the child said "Roll the ball" in French prior to the teacher.

Results. Latency, correct responding and number of sessions to criterion were similar for all subjects regardless of training setting. Subjects trained in the group, however, required significantly fewer individual training trials to reach criterion performance. The total number of sessions to criterion for the groups of four children was similar to the mean number of sessions to criterion for subjects who were individually trained.

Discussion. Results suggest that group errorless procedures can be as effective as individual procedures while being much more efficient in terms of investment of teacher and pupil time. It is thus recommended that teachers utilize group teaching procedures of this type whenever possible.

## STUDY 17: THE EFFECTS OF PROBE TRIAL DISTRIBUTION ON CHILDREN'S LEARNING A COMPLEX MATCHING TASK THROUGH OBSERVATION

(PIs: LeBlanc, Kramer, and Ruggles)

It is possible that the methods for evaluating child responses interact with what children learn through observation. For example, Thelen and Rennie (1972) concluded that a variable which affects the probability that reinforcement of a model's response would result in observational learning was whether there were explicit or implicit instructions to the subjects that they were expected to learn the model's responses. Such implicit instructions can emerge through probing conducted to determine what children have learned. One method for assessing what children learn is to interject a probe (of what is to be learned through observation) into a child's training trials. An alternative evaluation procedure would be to test what has been learned through observation only after all training is complete. Although the procedure of interjecting probe trials during training has the potential for instructing children to learn what others are being taught, waiting until after training to evaluate what was learned through observation implies to the child that one need not attend to what others are learning during training.

Purpose. The purposes of this research was to provide a preliminary investigation of instructional and motivational variables that might affect a child learning items taught to others in a group. At the same time, the differential effects between probes of children's responses that were interspersed with training trials and those that were administered periodically to separate blocks after training were examined.

Subjects/Setting. Four children, within normal developmental ranges, aged from 3 years, 9 months, to 4 years, 5 months, served as subjects. Sessions were conducted in a small experimental room containing a table and five chairs.

Data Collection. The experimenter recorded correct and incorrect responding, and observers recorded samples of the subjects' attending during training. The four subjects were observed individually for attending during one training trial of their own and once during a training trial of each of the other subjects. This procedure also occurred during probe trials for a total of eight observations per subject per session.

Design. Each child in the group of four was taught a different discrimination and thus had the opportunity to learn one discrimination through direct training and to learn three others through observation. Each subject daily received four training trials plus two probe trials for the items on which they were directly trained. In addition, each received one probe trial for a discrimination on which they observed training. After five training sessions, subjects received an individually administered periodic probe, consisting of trials on all items taught and tested in the group. On probe trials, responses were not consequated initially and on pretest and periodic probes, tokens were delivered noncontingently between trials. During training, correct responses to directly trained items were reinforced and incorrect responses were corrected.

Results. Figure 68 indicates the number of subjects who reached criterion on a greater number of observed items on either periodic or interspersed probes. Bars below the zero line indicate how many subjects reached criterion on a greater number of observed items on periodic probes (shaded bars). Bars above the zero line indicate how many subjects reached criterion on a greater number of observed items on daily interspersed probes. Zero differences indicate that the subjects did no better on one type of probe than on the other. More subjects demonstrated criterion responding on observed items during interspersed than periodic probes across conditions.

Discussion. The reason more subjects demonstrated criterion responding on observed items during interspersed than periodic probes may have been that interspersed probes occurred closer to the times the actual training was observed. In addition the interspersed probes were more similar to the group training setting, while periodic probes were administered individually.

## STUDY 18: EFFECTS OF VERBAL INSTRUCTIONS AND CONTINGENCIES ON PRESCHOOL CHILDREN'S OBSERVATIONAL LEARNING

(PIs: LeBlanc, Kramer, and Ruggles)

To develop procedures using observational learning requires that variables influencing such learning be identified. One set of variables that may have such an influence are those that precede or accompany a model's behavior. These variables may become discriminative stimuli for the observer that affect the probability that observational learning will occur. One such variable could be instructions indicating that children should attend to the teaching of other children.

Purpose. The purpose of this research was to analyze the effects of instructions and contingencies for attending on preschool children's observational learning, while being taught complex visual discriminations in a group.

Subjects/Setting. Eight preschool children, ranging from 4 years to 5 years, 4 months, from the Department of Human Development, Child Development Laboratory classrooms served as subjects. All sessions were conducted in a small room near the preschool classrooms.

Criterion Responding on
Either Interspersed or Periodic Probes
Observed Items

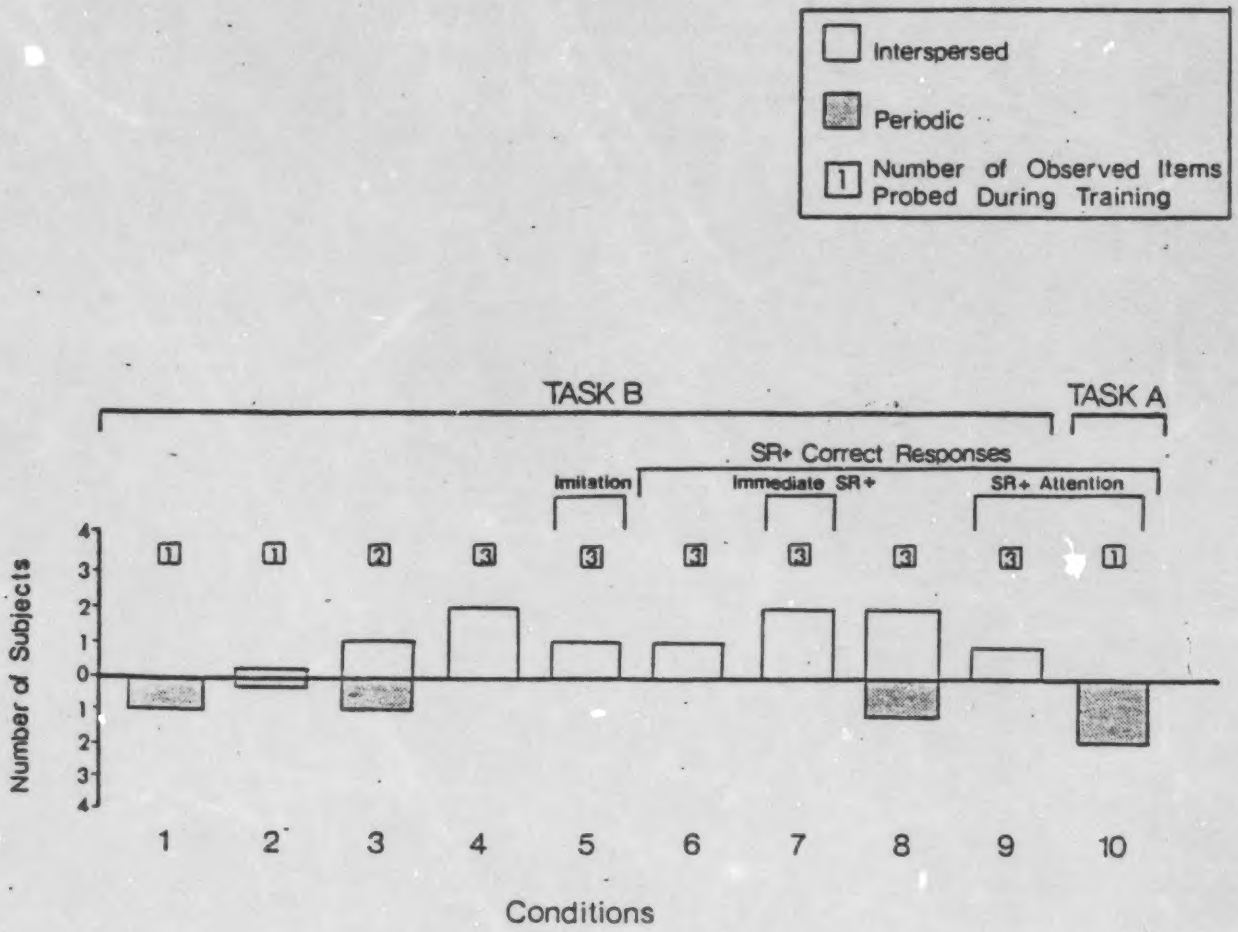


Figure 68

Data Collection. The subjects' correct and incorrect responses and attending were recorded.

Design. In a reversal design, the correct responding of two groups of four children to visual stimuli on which they observed training, while receiving instructions and contingencies for watching other children's responses, was noted; this behavior was compared to what which occurred when they received no instructions or contingencies for watching. The opportunities for direct training and learning through observations were the same as those in Study 17. After a cycle of five training sessions, the subjects received an individually administered probe that was similar to a pretest. Subjects earned tokens during all sessions and, at the end of each session, they had the opportunity to exchange the tokens for a toy.

Results. The results suggest that simple exposure of children to group training procedures is not sufficient, even when responses to observed items are reinforced, to assure the occurrence of observational learning. It is indicated that giving instructions and contingencies for attention to other children's responses is one method for initially facilitating such learning. Of the eight subjects in this research, all but one appeared to be initially influenced, to a greater or lesser extent, by instructions to attend during other children's trials. Such instructions may have provided the children with a strategy for learning through observation. Finally, the results also indicate that direct reinforcement for correct responding on observed items facilitates acquisition of observational learning, even though it is not sufficient in itself to facilitate such learning.

Discussion. A combination of reinforcement and instructions to attend appears to be the most desirable procedure to initially enhance and maintain observational learning. Using peers as models during group training of academic tasks can be an effective training method, provided that children are given information that indicates the critical behavior of the model and that motivates the children to learn through observation.

## STUDY 19: A PRELIMINARY INVESTIGATION OF TASK EFFECTS ON CHILDREN'S OBSERVATIONAL LEARNING

(PIs: LeBlanc, Kramer, Ruggles)

The results of Study 15 indicated that children will learn through observation while being taught related tasks in groups. From this research arose questions of whether group teaching automatically facilitates observational learning or whether other variables can be isolated that increase the likelihood of observational learning. Relatedness of the children's training tasks as well as task difficulty could influence whether or not children learn through observation.

Purpose. The purpose of this research was twofold: first, to analyze whether or not tasks that are related enhance the probability of the occurrence of observational learning; and, second, to analyze whether "easier" visual discriminations (pictures) are more readily acquired through observation than more difficult discriminations (words).

Subjects/Setting. The subjects were four preschool children from the Department of Human Development Child Development Laboratory classrooms. They ranged in age from 3.6 to 3.8 years. Sessions were conducted in a small experimental room containing a table and five chairs.

Data Collection. The subjects' correct and incorrect responses and attending were recorded.

Design. Each child was taught one 3-choice visual discrimination per condition. In each condition, two of the discriminations were unfamiliar pictures labeled with familiar names. The other two discriminations were four letter words all beginning with the same two letters. Children were taught to point to the correct choice. In a pretest-training-posttest design across two conditions, each child was taught a different discrimination. Children thus had the opportunity to observe training on the other three discriminations. During the first condition,stimuli that were unrelated across children were used; in the second, the word-picture pairs were related across children.

Results. Teaching discriminations of stimuli that were related through common verbal labels to a group of children did not enhance observational learning. Correct responding, however, was higher for most children on the easier (picture) tasks than for the more difficult (word) tasks. There were also differences across the eight children. Some children never learned through observation, while three children consistently learned at least the pictures through observations. Observational learning was also affected by whether or not the directly trained child acquired the discrimination.

Discussion. There are variables, in addition to vicarious reinforcement, that affect the probability of observational learning occurring in groups of children. It appears important for the child being taught the discrimination (to be learned by others through observation) to acquire the discrimination. Difficulty of task is also a factor, and this factor probably overrides any differences between teaching related and unrelated tasks that might be obtained.

## 20: IMPLEMENTING TEACHING ASSESSMENT STRATEGIES IN INDIVIDUAL AND GROUP SETTINGS: OBSERVATIONAL AND MEDIATIONAL LEARNING OF CONCEPTS IN GROUP SETTINGS

(PIs: LeBlanc, Ruggles, and Fallows)

As indicated by LeBlanc, Ruggles, and Kramer in Study 15, it is possible to utilize a mediation paradigm in teaching verbal labels to children in groups, i.e., it is possible to have some children point to a printed word when provided the verbal label, and to have others in the group learn to point to the associated picture for the same verbal label and then have all children be able to match the associated pictures with the printed words. For such a teaching procedure to be effective in normal classroom usage, it should be extended, e.g., to the teaching of concepts.

Purpose. The purpose of this study was to examine the feasibility of using an equivalency paradigm in combination with observational learning to teach the concepts "fruits" and "vegetables" to preschool children.

Subjects/Setting. The subjects were four preschool children (age 3 years, 6 months to five years from the Child Development Laboratory preschool classroom. The children had been tested and had demonstrated no previous ability to discriminate fruits and vegetables. Sessions were conducted in a small room with a table and chairs for the group of four subjects and a teacher.

Design. The strategy of the observational and mediational learning procedure can be illustrated through noting what one child learned. Child 1, for example, was first trained to choose the picture of the blueberry, when the sample (in a match-to-sample format) was melon (or melon when the sample was blueberry). Following acquisition, this child was taught to match "apple" and "blueberry". Following this acquisition, the match between "apple" and "plum" was trained. In the last phase of training, the child was taught the verbal label "fruit" for one of the stimuli. In this case, the child was presented with the stimulus "plum" plus a distractor and instructed to "point to fruit." After being taught that plum was fruit, the child should be able to apply the label "fruit" across the other members of the stimulus set. While Child 1 was receiving the training just described, Child 2 was being trained on other matches from the class "fruit." Three of the four stimuli used in teaching matches to Child 2 were different from those taught to Child 1. The fourth stimulus, "plum," was common to the training given to both children. While Child 1 and Child 2 were taught "fruit" labels and equivalencies, the other two children in the group were trained from the "vegetable" class.

Two separate experimental groups were involved in this experiment. One group of children was taught the international symbols representing different fruits and vegetables and the other was taught from actual pictures of the fruits and vegetables.

Data Collection.

1. An assessment was made of each child's acquisition of the equivalencies and auditory labels on which they were directly trained. Thus, for Child 1, acquisition of the equivalencies melon and blueberry, blueberry and apple, and apple and plum, and the auditory label "fruit" for the stimulus plum were assessed through measurement of performance on daily training and on periodic probes.

2. Assessment was made of those emergent relationships resulting from each child's own training. This performance was measured through periodic probes. Again, using Child 1 as an example, periodic probes were used to measure acquisition of the equivalence relationships between melon and apple, plum and blueberry, and melon and plum. It should be noted that these relationships were not directly trained. It was hypothesized that these relationships would emerge as a function of the stimulus equivalency training described in Figure .

3. An assessment was made of whether the child applied the "concept label" ("fruit" or "vegetable") across all members of the set of "equivalent" stimuli after auditory label training was completed. Thus, in the case of Child 1, periodic probes were used to assess whether once the child was taught that plum equals "fruit," did the child then apply the "fruit" label to plum, apple, blueberry, and melon.

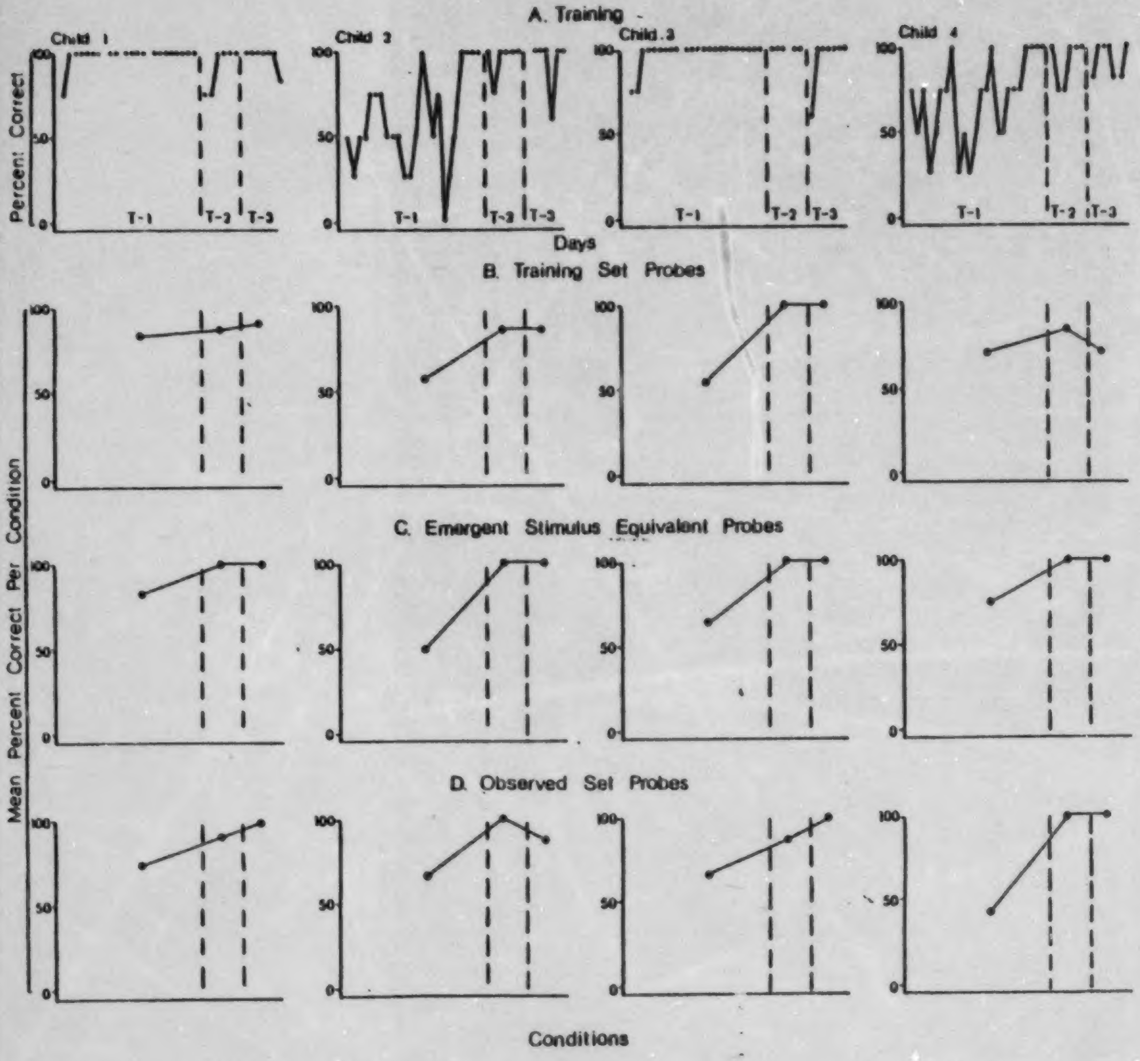
4. An assessment was made of whether each child learned any of the equivalencies taught to any of the other children in the group. Thus, Child 1 was given periodic probes on the equivalencies plum and watermelon, watermelon and cherry, cherry and banana, cauliflower and potato, etc. (Each child was probed on all relationships that had been trained within the group.)

5. The assessment was made of whether the child applied the concept label taught to all those stimuli within the same class and whether the child applied the other concept label to the appropriate stimuli. In other words, did Child 1 apply the label "fruit" to those stimuli which were in the equivalent relationships taught to Child 2 and did Child 1 apply the label "vegetable" to those stimuli taught to Child 3 and Child 4.

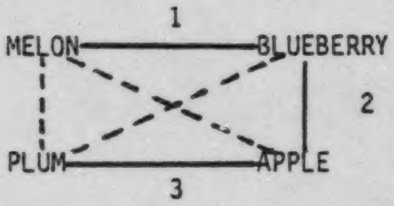
Results. For those children taught the international symbols, the results indicated that all directly trained and observed relationships were learned as well as all the stimulus equivalencies that could emerge as a function of direct training and observational learning (Figure 69). For those children taught from the actual pictures of fruits and vegetables, the results were not as clear. They learned the relationships on which they were directly trained, but emergent relationships from direct training and/or observational learning were not learned, nor were relationships stemming from observational learning (Figure 70).

Discussion. The data from these two groups indicate that children taught individually in a group situation learn concepts which are not directly taught to any of the groups' members; they also learn what is taught to others through observational learning. This information provides a basis for further analyses of the procedures to use when observational learning does not occur and when emergent stimulus relationships are not demonstrated. The development of methods to assure that stimulus relationships can emerge from previously taught relationships will provide an opportunity to set up procedures for assuring stimulus generalization rather than merely looking to see if it occurs in the teaching environment.

## EXPERIMENT I

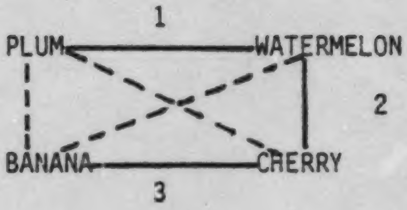


Child 1


1
MELON
BLUEBERRY
2
PLUM
APPLE
3

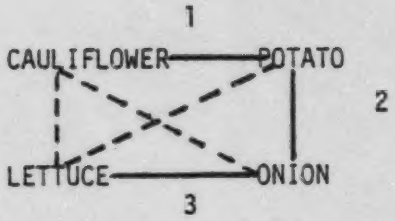
4. PLUM = FRUIT

Child 2


1
PLUM
WATERMELON
2
BANANA
CHERRY
3

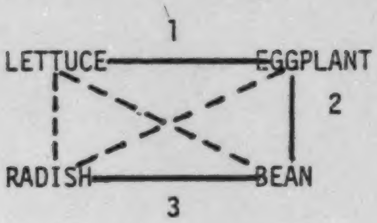
4. PLUM = FRUIT

Child 3


1
CAULIFLOWER
POTATO
2
LETTUCE
ONION
3

4. LETTUCE = VEGETABLE

Child 4


1
LETTUCE
EGGPLANT
2
RADISH
BEAN
3

4. LETTUCE = VEGETABLE

FIGURE 70

## Discussion of Overall Findings and Significant Results.

1. Identification of optimal instructional procedures for working with at-risk children:

The results of the research reported in Studies 1 through 12 provide information regarding the optimal procedures for teaching academic tasks to children with learning problems. Results indicate that teachers should limit instructions to those that are essential and directly related to the critical variables in the tasks to be learned. There is further indication that teachers should be aware of potential interactions of instructions used in the teaching process. In some cases, less than optimal procedures in one task can be enhanced by using more optimal procedures in a task taught simultaneously. It was further indicated that the temporal distribution of learning is important and is directly related to the types of tasks and instructions involved. Teachers should, therefore, analyze the types of responding required for tasks and determine the time needed to complete the tasks accordingly. Whether or not to use backward or forward chaining procedures in teaching should also be determined according to the task involved; e.g., it is likely that motor tasks, such as dressing, should be taught with backward chaining and academic tasks, such as learning number sequence, should be taught with forward chaining. How the stimuli involved in learning tasks are presented to children can also affect discrimination acquisition. It is much better to intermix stimuli during training than to teach only one stimulus at a time. These results pertain to normal, at-risk and difficult-to-teach children.

2. Prescribing the best instructional strategies for individual children and tasks:

Children who have difficulty learning should have their entire learning environment assessed and a battery of procedures prescribed, according to the results of the analysis. Studies 13 and 14 are examples of how such analyses and prescriptions should be conducted.

3. Development of methods for implementing optimal strategies to minimize the cost of the teaching environment and the requirements of teachers in that environment:

Teaching children in groups is obviously less time-consuming for teachers and thus, in a sense, less costly. This principle, however, does not maintain if the teaching procedures are less than optimal. Thus procedures for making group teaching as effective or more effective than individualized teaching need to be developed. This was the purpose of Studies 15 through 20. The results from this research indicate that optimal procedures for teaching children individually can be altered for use in group teaching situations, resulting in as much if not more learning than occurs with the same procedures used individually.

4. Instructions associated with teaching discriminations between stimuli should involve the following:

a) Instructions should include the fewest possible words.

b) Instructions should be related to the stimulus differences that are critical for discrimination formation, i.e., they should be criterion-related.

c) If exemplars are used in instructions regarding stimulus differences, these should be directly related to the critical stimulus differences.

d) Children of normal development, as well as those having learning difficulties, respond similarly to instructional formats.

e) Within certain time parameters, the imposition of temporal limitations on responding during discrimination acquisition has essentially no effect.

f) Allowing an extraordinarily long time for responding of children results in their engaging in behaviors that are not task-related.

g) Neither backward nor forward chaining is the better teaching procedure. It appears that backward chaining may be a more efficient teaching procedure for large motor tasks and self-help skills, whereas forward chaining appears to be a more effective procedure for teaching academic related skills, e.g., chaining numbers.

h) In tasks involving a discrimination between visual stimuli, intermixing the stimuli to be learned is a more effective teaching procedure than a massed presentation of the stimuli.

i) Group teaching that maximizes observational learning is more effective for teaching some skills than individualized teaching.

j) Utilizing mediational teaching strategies optimizes teaching time and enhances generalization of learning.

k) Children who are taught individually in a group learn concepts that are not directly taught to any of the group's members; they also learn what is taught to others, through observational learning.

# CHAPTER IV INTEGRATIVE RESEARCH PARAMETERS

## INTRODUCTION

The research studies described in the earlier sections of this proposal have resulted in information that will benefit those working with young handicapped children. Each study taken alone contributes to the field; however, the Institute investigators strongly believe that the impact of the research described here will be much larger because the research studies are integrated conceptually, and the data generated have been compared across studies.

The Institute investigators established a systematic plan to insure that integration of research occurred, both within and across the major research sections of Ecological Guides to Intervention, Developmental Guides to Intervention, and Assessment Guides to Intervention. This section has been called Integrative Research Parameters to reflect its orientation to knowing, managing or manipulating the parameters or variables defined and utilized by Institute investigators in ways that will maximize the generality of the research and will identify relationships existing among those variables used in different studies.

Specifically, this section has had four goals directed toward an integrative research effort:

1. The development of a data-base management system (DBMS) for the coordination and integration of data;
2. The establishment of a data-collection team that obtains descriptive information on subjects within the data pool used by investigators;
3. The establishment of a communication network among the investigators of the Institute; and
4. The design and implementation of research projects that integrate and correlate data within the DBMS.

The effort to integrate research has required a major commitment from Institute investigators, as well as considerable resources. However, this investment has resulted in sufficient benefits to justify it. It has provided a maximal use of the data collected. That is, by contributing to a centralized data pool, information could be related to a variety of measures other than those that were the major concern of the study. Second, such integration of research prevented the isolation of a given research effort--an event which is likely to occur if steps are not taken to prevent it. Another benefit has been that researchers could unify their efforts to provide for maximum generality of results. That is, where researchers were examining similar phenomena, communication beforehand allowed for the same conventions for data collection; thus, their research could be comparable when desired.

Additionally, information gathered on the subjects within the data pool by individuals or projects affiliated with the Institute could be combined and related to variables studied by Institute investigators.

The Institute data were provided to the Parsons Visual Acuity project to maximize the benefit of their results. One final, but important, reason for the integration of research parameters was that it permitted the generalization of information not otherwise available. A variety of measures taken across a group of children by different investigators could be examined for relationships that may exist among those variables. Evidence of correlations may point the way to more extensive future analyses of those relationships, through more descriptive studies and through manipulative experiments. In these ways, the amount of information obtained from the Institute is greater than that derived from the collection of unintegrated research studies.

### Rationale

The staff of Integrative Research Parameters has been engaged in four major activities to promote the goals described above. First, they developed a data-base management system for the coordination and integration of data. Second, a data-collection team obtained information on children and families within the data pool used across investigators, including demographic information and psychometric assessments. The third activity was implementing a system to monitor each research project and establishing a communication network among investigators. The fourth activity was to design and implement research projects that would integrate and correlate data within the data-base management system. Each of these activities was planned and implemented with other members of the core staff and the investigators, since the system works best when all concerned have input and can give instructive feedback. However, responsibility for all of these activities rested with the Integrative Research Parameters team.

## THE DATA-BASE MANAGEMENT SYSTEM

### A. DESIGN AND DEVELOPMENT:

Martin (1975) defines a data base as:

> a collection of interrelated data stored together with as little redundancy as possible to serve one or more applications in an optimal fashion; the data stored so that they are independent of programs which used the data. A common controlled approach is used in adding new data, and in modifying and retrieving existing data within the data base (p. 19).

During the first four years of the Institute, a heavy emphasis was placed on the design and implementation of the DBMS. Finneran and Henry (1977) emphasize the importance of doing extensive system planning or analysis on paper before committing it to reality through programming. This allows for maximum input by users (Keen & Gerson, 1977), and builds a system that is responsive to the needs of the Institute investigators. Keen and Gerson also recommend doing a 'walkthrough' with users prior to implementation to insure that they understand what the system is and how it works, and to provide them with a situation to critique and modify before the system is finalized. It was realized that additional modifications would be made throughout the life of the DBMS, but many conceptual problems were identified at the outset, limiting the number of costly modifications needed later.

The DBMS was designed to promote investigator use and input (Keen & Gerson, 1977). A centralized clearinghouse for data entry insured the integrity of the data pool (that is, insured that data were in appropriate format, and that a common source would compile and document all data included in the system). A system for assigning identification numbers to subjects insured their anonymity within the DBMS. In this way, privacy of information was assured (Fry & Sibley, 1976; Martin, 1975). Figure 71 shows the completion of the steps in the initial design of the data base system.

An important feature of the DBMS, crucial to the Institute, was that data could be added at any time and not affect the programs that manipulated those data. Conversely, new programs could be added or old ones modified and not change the data in the DBMS. This "data independence" (Martin, 1975) was particularly useful for the Institute. For example, one of the manipulations of data valuable for the Institute was correlations between sets of data as obtained through the Pearson product-moment correlation coefficient. This statistic was applied to a variety of measures stored within the DBMS. A few examples of interesting correlations are:

a) the attitude of the mother toward pregnancy and the results of neonatal assessment on the Brazelton.

b) the score on the Stanford-Binet and the proportion of time that an individual interacts with either normal or handicapped peers.

c) the performance of children on a learning assessment task with scores on standardized tests.

In the above instances, the same data manipulations are performed on different sets of data. The data used are independent of the manipulation. Conversely, these same data were subjected to other types of manipulation. For example, they were used to obtain descriptive statistics of many of the measures obtained in:

a) a frequency distribution of the proportion of time that children identified as handicapped or normal engage in cooperative, parallel, or isolate play;

b) the mean proportion of opportunities that teachers use for incidental teaching techniques during freeplay;

c) the percentage of handicapped or normal children who score below criterion on learning a task with a specific teaching strategy.

TIMELINE FOR BUILDING DATA-BASE MANAGEMENT SYSTEM (DBMS) BY FOSTER

| | YEAR 02 QUARTERS | | | | YEAR 03 QUARTERS | | | | YEAR 04 QUARTERS | | | | YEAR 05 QUARTERS | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | 1st | 2nd | 3rd | 4th | |
| 1. Construct Model of DBMS | | ■ | ■ | ▨ | ▨ | | | | | | | | | | | | COMPLETED |
| 2. Design workshop for investigators | | ■ | ■ | | | | | | | | | | | | | | COMPLETED |
| 3. Construct examples of the use of the DBMS | | | ■ | ■ | ▨ | | | | | | | | | | | | COMPLETED |
| 4. Hold workshop | | | | ■ | | | | | | | | | | | | | COMPLETED |
| 5. Integrate investigator feedback into DBMS model | | | | | ■ | | | | | | | | | | | | COMPLETED |
| 6. Complete initial design of DBMS | | | | ■ | ■ | ■ | | | | | | | | | | | COMPLETED, BUT SUBJECT TO CONTINUING REVISIONS |
| 7. Check design with core staff | | | | | | | ■ | | | | | | | | | | COMPLETED |
| 8. Provide design to investigators for feedback | | | | | | | ■ | | | | | | | | | | COMPLETED |
| 9. Assign programming resp. & get DBMS operating | | | | | | ■ | ■ | ■ | ■ | | | | | | | | COMPLETED |
| 10. Continue programming additional functions & adding data | | | | | | ■ | ■ | ▨ | ▨ | ▨ | ▨ | ▨ | ▨ | ▨ | ▨ | ▨ | |

■ - PILOT OR MAIN STUDY ▨ - REPLICATION OR ELABORATION

Figure 71

In these examples, different manipulations could be applied to subsets of data within the DBMS without affecting those data. That is, those same data were still available for additional manipulations, as desired. These examples are meant to represent the kinds of data and manipulations considered within the Institute. Many others were included in the DBMS; these are not meant to be exhaustive.

### Data-Collection Team

Although the emphasis of this Institute was on behaviorally oriented research and prescriptive assessment, there was a need for an auxiliary program of psychometric assessment to accompany the behavioral assessment and intervention strategies developed by the Institute.

The collection of traditional assessment information was not intended to follow a research design itself. Rather, this information was collected on children within the data pool, and the relationships between tests and other data within the data-base management system determined. At the same time that the tests were given, the testers also obtained demographic information on the child and the child's family. The purposes of this assessment program were:

1. The availability of standardized test information for children used as subjects in the research program provided a common method for communicating to others what type of subjects they are (Evans & Nelson, 1977). Although it was still possible to use data generated through the research effort to describe these children, this did not provide information on how the children compared to others within the normal population in a systematic way. This information was quite important to many consumers of our research efforts, and was obtained through the use of a normative, standardized test battery.

2. A standardized test battery given periodically to children within the research population was used as a partial check of the effectiveness of the intervention procedures developed (Evans & Nelson, 1977) and a validity measure of the assessment devices developed. That is, if children demonstrated increases in scores on the test battery concurrently with the application of some intervention procedures, then this added strength to the conclusion that the intervention procedure alleviated to some extent the at-risk or handicapping condition. Additionally, the relationship between assessment procedures developed by the Institute and the results of the traditional test battery examined to see if the information provided by both was congruent. This resulted in correlational information between the traditional tests and the variables examined by the Institute. It must be realized, however, that information obtained in this way can only provide added strength

or cast doubts about the conclusions drawn through the research effort. It cannot be used for determining causal relationships.

3. Another reason for the availability of the results of periodic testing of children within the research sample was that this information could be included in the data-base management system. This information would then be quite useful for researchers at other institutes who might want access to our data base. More important, this information was used to analyze relationships among variables within the data base to see what variables may warrant more systematic research efforts. It may provide information on the impact of an intervention program on variables or test items other than those directly affected (Evans & Nelson, 1977). For instance, if it is found that children who respond one way on a specific test item seem to come from homes in which parents respond to their child in a certain way, then this relationship may be investigated systematically. It is anticipated that the availability of this data-base management system will be a potential source of significant research questions.

4. A final benefit of the traditional test information is that it is possible that it may be useful as a screening procedure for determining which children, especially those outside of the classrooms operated by investigators within the Institute, may be most appropriate for further prescriptive testing. By eliminating children who are at the extreme ends of the distribution of scores for the assessment devices, only those children who are more likely to benefit from further assessment and intervention will receive it. That is, children who score within one standard deviation either way from the mean score for that age can undergo further assessment. Those who score quite low are those who are already identified as handicapped, and they can be included for testing where appropriate for the investigators' goals. Those who score quite high will be excluded, since the probability of their being at-risk is quite low (Camp, Van Doorninck, Frankenburg, & Lampe, 1977).

The traditional assessment battery provides valuable information to the researchers within the Institute, as well as those individuals who are interested in the research and products developed by the Institute. For this reason, an effort was made to include a periodic assessment of many of the research subjects within the Institute.

Although these areas of data collection are of interest to all investigators within the Institute, they can be obtained more efficiently by a central team. In most cases it would be more efficient to have a centralized group of psychometricians to collect this information systematically on all subjects rather than have each investigator organize, train, and supervise several people to collect this same information on child and family characteristics.

## Research Monitoring System

The Research Monitoring function of Integrative Research Parameters provided the basis for analyzing data accumulated across research projects. Data from subjects who participated in multiple studies were examined to determine what relationships existed. These kinds of analyses could only result from a large programmatic and cooperative research effort.

## Technical Resources: Datatrieve-11

The Data-Base Management System relied especially on the DATATRIEVE-11 (Digital Equipment Corporation) software file management system. The decision to use DATATRIEVE-11 as the basis for the DBMS was made in October, 1978. The Computer Applications Unit of the Bureau of Child Research made arrangements for the purchase of this system, and it was installed in the summer of 1979. The system not only proved to be as useful as originally expected, but additional benefits were discovered. It was used for direct data entry by relatively untrained staff, thus, greatly reducing the turn-around time required before researchers could examine their data. Additionally, many of the more complex steps required to perform some analyses (e.g., those for Investigator Embry) could be put into nested procedures and brought forth with a single command. This procedure allowed researchers to enter data from a session, call the necessary procedure, and obtain the needed analyses as quickly as desired. Rapid turn-around was especially useful for Investigator Peterson, who summarized observational data every two days. The Institute's data-management requirements included a) building new files from subsets and intersections among existing files, b) obtaining summarization of data from a given file within and across subjects, and c) report writing. These functions were needed quickly and required little specialized knowledge of the functions. Additionally, the Institute required that some data sets be subjected to more complex statistical analyses in which immediate feedback was less important.

An analysis was made of four data-base management systems (DataBasic, MDQS II, MDQS IV, and DATATRIEVE-11) to determine what arrangements would maximize the investigators' use of these data in fulfilling the goals of the grant. An analysis of the characteristics of each of these systems showed that none of them had all of the necessary components. However, DATATRIEVE-11 was selected because it was useful for most of the needs of the Institute. It is a fully interactive system that allows relatively unsophisticated users to retrieve and manipulate files and to print out tables providing simple summarization of the data. The primary weakness of DATATRIEVE-11 was its limited provisions for statistical analyses. However, this weakness was compensated by the availability of two excellent statistical packages (SPSS, BMDP) at the University of Kansas Academic Computer Center.

## B. TECHNICAL RESOURCES: General

Hardware and software support was provided by the Computer Applications Unit (CAU) of the John T. Stewart Children's Center and the Academic Computer Center (ACC) of the University of Kansas. The bulk of the DBMS was stored on the 128-K PDP 11/34 at the CAU. A few projects, which required flexible computer time, statistical analysis, or the manipulation of extremely large data sets were stored on, or transferred to, the Honeywell at the Academic Computer Center. Input and output devices consisted of both CRT's and printers and were provided by the above facilities, the Institute, and the Department of Human Development of the University of Kansas.

## C. STAFF

During the term of the Institute, the continuous staff of the DBMS consisted of a supervisory investigator and a manager. At any given time, the manager directed one to three part-time general data-entry staff and one to four data-entry staff for individual research projects. A total of 15 persons were trained and supervised in the use of various hardware and software tools available for data input and analysis. In addition, four persons with specialized training served on the DBMS staff team as testers in the collection of standardized test data. Operations and programming support were provided by the Institute staff in collaboration with the Computer Applications Unit of the John T. Stewart Children's Center. Some programming consultation was provided by the consultation staff at the Academic Computer Center of the University of Kansas.

## D. OPERATION

Planning for Data Input. Considerable energy was invested in the development of the system for inputting researcher's data, insuring confidentiality, and providing documentation of the data included in the data base. The initial step in the input of the data to the data base was communication between the IRP staff and the individual ECI researchers. IRP staff members gathered information on each ECI research project and submitted a Research Project Report (form 003) for the Research Projects File and were responsible for updating this report as the research progressed. The IRP staff member offered consultation regarding the data-base services and procedures; assisted in planning to aid data-base input; arranged any cross-project interfaces; and helped with any specific problems hindering the progress of research projects, especially in the development of observational instruments. These matters were communicated in the IRP staff at weekly staff meetings, where progress and problems were discussed, initial planning for input began, and potential cross-project integration was determined.

Formal Data Input Procedures. When a research project was underway and the reliability of the data had been demonstrated, a project was ready for input to the data base. The data-base administrative staff met with the researcher to obtain necessary information on the project and plan the intake procedures and schedule. At this meeting, the Research Projects File was updated and the project assigned a three-digit identification code (Project ID) to be used in computer storage of the data. The project was added to the Project Index (form 005) of the Supervisory Investigator's folder and all papers on the project were transferred from the "Unclassified" section to a section classified by the Project ID. The Research Project Report (form 003) was updated and final copies of all data collection instruments obtained and placed in the Research Projects File. Copies of all forms described below were also stored in this file.

To insure confidentiality, the names of the subjects in a project were not stored in the computer and never appeared on any forms in the Research Projects File. Each subject was assigned a sixteen-digit identification code called a "Subject Identifier" or "Subject ID". The researcher was asked to provide name, birthdate, and sex information of the Subject ID Information form (form 001--see Figure 72 also for a descriptive example of the Subject ID), and to place a number beside each name. Upon receipt of this information, the Subject Identifiers were assigned and the researcher was given a list of the ID's (form 002) using the numbers as a cross reference. A cross-index of subject names and subject identifiers (Alpha-Name File, Subject ID File) was kept in a locked cabinet accessible only by the data-base staff. Figure 73 depicts the procedures involved in assigning Project ID's and Subject ID's.

From the information collected at the initial meeting, a Project Write-Up and an estimate of computer storage space requirements were submitted to the Computer Applications Unit consultant. Staff assignments and timelines were specified for formatting the data, data entry procedures, programming requirements, and monitoring and evaluation. To allow for the greatest flexibility of analyses for the researchers and to minimize transcription errors, raw data were entered directly from the collection instruments. Formats were developed for data entry to provide maximum efficiency and minimal error. The data were also formatted for manipulation by DATATRIEVE-11 and for statistical packages and Fortran programs if needed. Programming requirements were met with DATATRIEVE-11--with SPSS, BMDP, and Fortran options available. In addition to weekly monitoring and evaluation of the individual research projects included in the data base, the data-base administrative staff developed procedures to establish a computer-generated program to monitor the overall data-base management system.

## E. DESCRIPTION:

As of May, 1982, 812 individual subjects were included in the Institute data-base. The distribution of these subjects within projects by number of subjects, number of data units and storage blocks is shown in Table 11. Figure 74 and Table 12 show percentages of subjects per investigator per Institute area.

FORM 001
ECI DATA-BASE MANAGEMENT SYSTEM

PROJECT ID__________

SUBJECT ID INFORMATION

INSTRUCTIONS: To insure confidentiality, the names of research subjects are not stored in the computer files. Each subject is identified by a 16-digit ID code, called a subject identifier. An index of subject names is kept in a locked file accessible only by the data-base administrator. A descriptive example of a subject identifier follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| K | 0 0 2 0 6 | E 0 1 | 7 4 | 0 9 | 1 2 | M |
| (Institute identifier, K=Kansas) | (Subject #, assigned sequentially as added to data-base) | (Project ID, E = investigator's code, 01 = project#) | (Birth year - | month - | day) | (Sex) |

To obtain subject identifiers, provide name, birth- date and sex information on this form for each subject. To further insure confidentiality, please provide a code number for each subject in the "Subject #" column, so we may return a list of subject identifiers paired with code numbers rather than names. Please sign below to indicate that you have read these instructions and will maintain this confidentiality in your records.

RESEARCHERS" SIGNATURE:________________________DATE:________________

| SUBJECT # | NAME: LAST | FIRST | M.I. | BIRTH: YEAR | MONTH | DAY | SEX |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Figure 72

## ADDING DATA TO THE ECI DATA-BASE SYSTEM: PROCEDURES FOR PROJECT AND SUBJECT ID ASSIGNMENTS

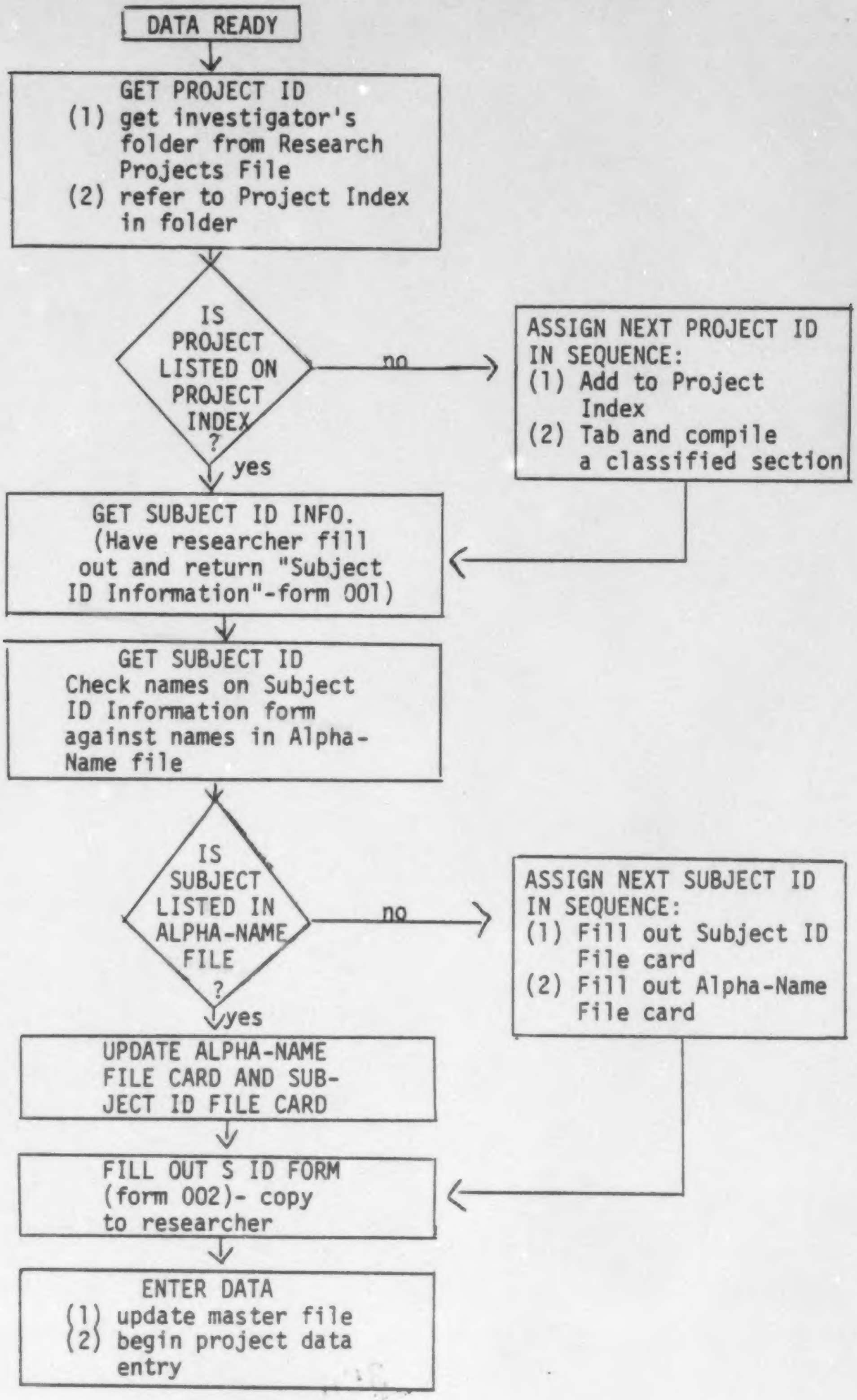

DATA READY
GET PROJECT ID
(1) get investigator's folder from Research Projects File
(2) refer to Project Index in folder
IS PROJECT LISTED ON PROJECT INDEX ?
no
ASSIGN NEXT PROJECT ID IN SEQUENCE:
(1) Add to Project Index
(2) Tab and compile a classified section
yes
GET SUBJECT ID INFO.
(Have researcher fill out and return "Subject ID Information"-form 001)
GET SUBJECT ID
Check names on Subject ID Information form against names in Alpha-Name file
IS SUBJECT LISTED IN ALPHA-NAME FILE ?
no
ASSIGN NEXT SUBJECT ID IN SEQUENCE:
(1) Fill out Subject ID File card
(2) Fill out Alpha-Name File card
yes
UPDATE ALPHA-NAME FILE CARD AND SUBJECT ID FILE CARD
FILL OUT S ID FORM (form 002)- copy to researcher
ENTER DATA
(1) update master file
(2) begin project data entry

Figure 73

## TABLE 11

## INTEGRATIVE RESEARCH PARAMETERS

## DATA BASE SUMMARY - MAY 1982

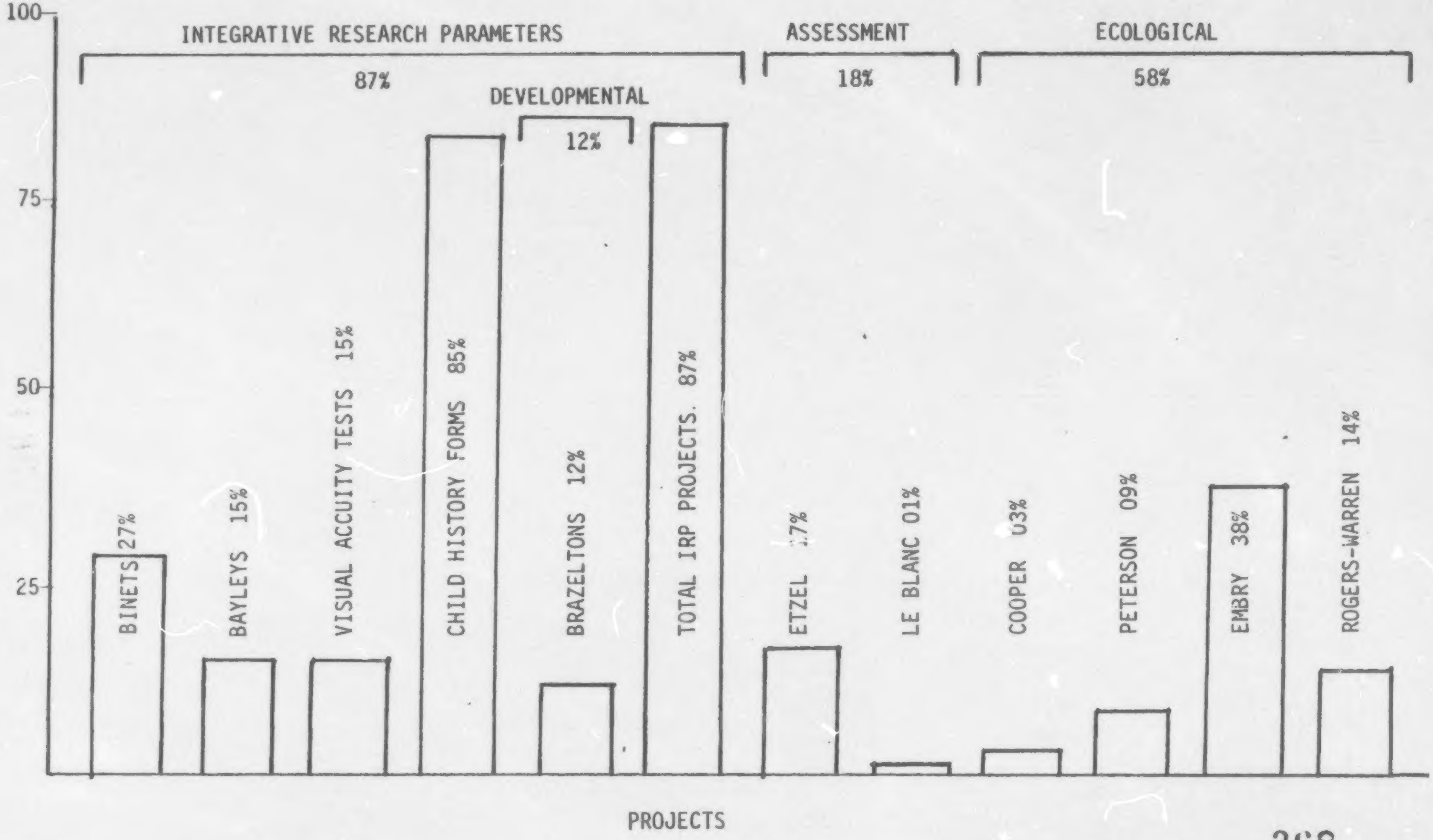
| PROJECT CODE | DATA NAME | DATA TYPE | TOTAL SUBJECTS | TOTAL UNITS | TOTAL BLOCKS |
|---|---|---|---|---|---|
| FOSTER | | | 0812 | | 02451 |
| IDS | MASTER | RECRD | 0812 | 0812 | 00430 |
| F01 | BINET | TESTS | 0152 | 0235 | 00130 |
| F02 | BAYLEY | TESTS | 0081 | 0112 | 00300 |
| F03 | VISUAL | TESTS | 0084 | 0174 | 00096 |
| F04 | HISTORY | FORMS | 0466 | 0466 | 01345 |
| (HROWTZ) | | | | | |
| H01 | BRAZELTON | TESTS | 0071 | 0071 | 00150 |
| PETERSON | | | 0050 | 1280 | 09400 |
| P01 | SOCIAL | OBS | 0050 | 1280 | 09400 |
| ETZEL | | | 0093 | | 01700 |
| Z01 | STELLA | OBS | 0053 | 0904 | 01500 |
| Z02 | AANGEENBRUG | OBS | 0051 | 0032 | 00200 |
| LEBLANC | | | 0007 | | 01000 |
| L01 | BAXTER | OBS | 0007 | | 01000 |
| COOPER | | | 0024 | 1770 | 02520 |
| C01 | SOCIAL | OBS | 0024 | 1770 | 02520 |
| EMBRY | | | 0608 | | 15866 |
| E01 | CIC | FORM | 0084 | 0856 | 02805 |
| E02 | PC | OBS | 0135 | 2435 | 10915 |
| E03 | OTHER | MISC | 0158 | 0477 | 02126 |
| E04 | PARENTS | RECRD | 0231 | 0231 | 00020 |
| ROGERS WARREN | | | 0096 | | 31309 |
| R01 | LANGXMC | OBS | | 0360 | 18394 |
| R02 | LANGXGEN | OBS | | | 12900 |
| R03 | OTHER | MISC | | | |
| R04 | DATA | RECRD | 0072 | 0072 | 00015 |

## INTEGRATIVE RESEARCH PARAMETERS

## DISTRIBUTION OF DATA BASE CHILD SUBJECTS ACROSS AREA PROJECTS

Figure 74

(TOTAL CHILD SUBJECTS = 555)

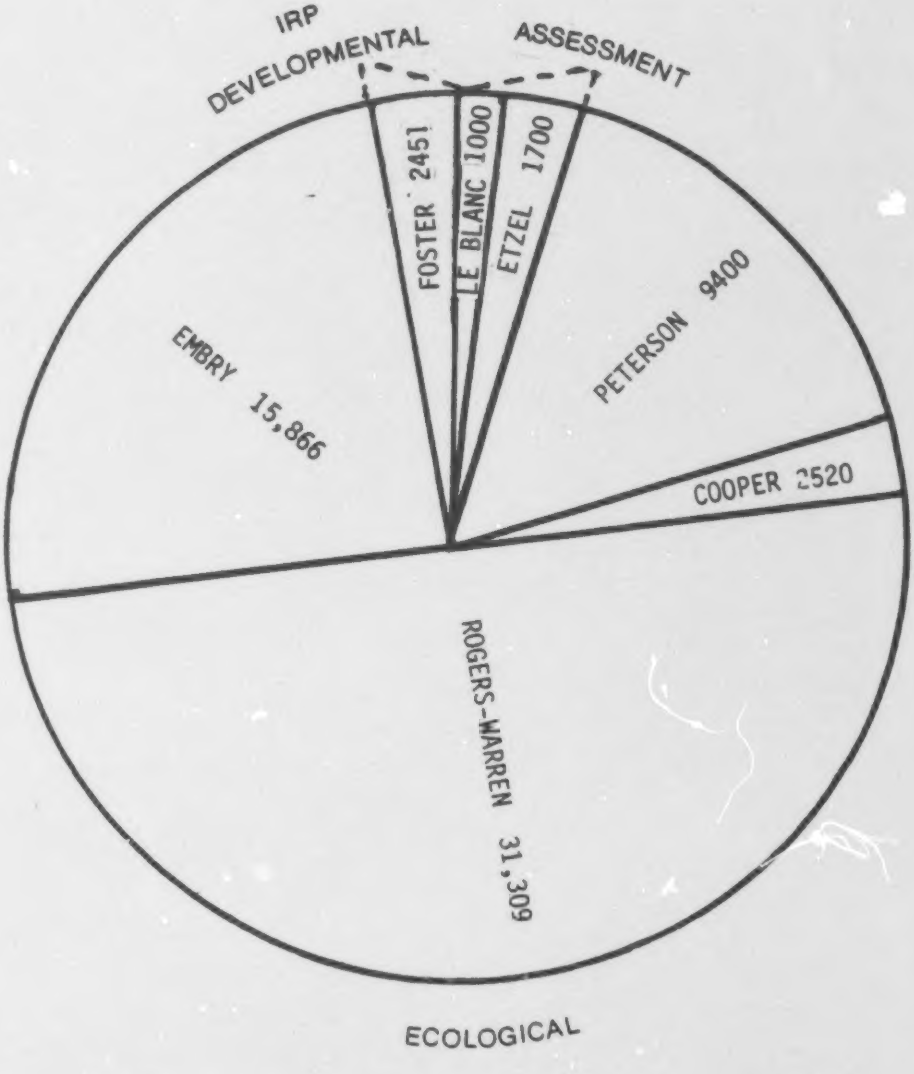


## TABLE 12

## INTEGRATIVE RESEARCH PARAMETERS

## DISTRIBUTION OF COMPUTER STORAGE BLOCKS ACROSS AREA PROJECTS

| | |
|---|---|
| TOTAL BLOCKS.................. | 64,246 |
| TOTAL BLOCKS WITH BACK-UP..... | 129,980 |



The 19 projects contributing to the data base were:

1. Foster IDS - the master file for the data base containing subject and project classification data for 812 subjects
2. Foster F01 - Stanford-Binet test data with 235 tests stored for 152 subjects
3. Foster F02 - 112 Bayley tests for 81 subjects
4. Foster F03 - 174 visual acuity data samples for 84 subjects
5. Foster F04 - demographic and developmental data from the Child History form for 466 subjects (data entry continued for these forms throughout June, 1982, to include subjects which had data for Investigator Embry only)
6. Horowitz H01 - Brazelton test data for 71 subjects
7. Peterson P01 - social interaction data in preschool classrooms for 50 subjects
8. Etzel/Stella Z01 - visual attention to learning tasks for 53 subjects
9. Etzel/Aangeenbrug Z02 - learning assessment data for 51 subjects
10. LeBlanc/Baxter - learning task data for seven subjects
11. Cooper C01 - social interaction for 24 children
12. Embry E01 - community interaction data for 84 parents
13. Embry E02 - parent-child interaction data for 135 child subjects
14. Embry E03 - miscellaneous projects data for 158 child-parent interaction subjects
15. Embry E04 - parent descriptive data for 231 parents

16,17,18. Rogers-Warren R01, R02, R03 - mother-child interaction data for 96 subjects

19. Rogers-Warren R04 - descriptive data for 72 child subjects

Each subject included in the data base had data in at least two different projects. Table 13 shows these interrelationships; the numbers of subjects in each project in the left column having data in the other projects are listed. A description of the major tasks accomplished by the data base for individual Institute investigators is shown in Table 14, a Status Report for the Early Childhood Institute Data Base Management System.

## TABLE 13

## INTEGRATIVE RESEARCH PARAMETERS

## CROSS-PROJECT SUBJECT SUMMARY - MAY 1982

| PROJECT CODE | DATA NAME | F01 | F02 | F03 | F04 | H01 | P01 | Z01 | Z02 | L01 | C01 | E01 | E02 | E03 | R01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FOSTER | | | | | | | | | | | | | | | |
| IDS | MASTER | 152 | 081 | 084 | 342 | 071 | 050 | 053 | 051 | 007 | 024 | 084 | 127 | 158 | 096 |
| F01 | BINET | 152 | 021 | 022 | 127 | 044 | 021 | 022 | 048 | 006 | 006 | 025 | 031 | 022 | 028 |
| F02 | BAYLEY | 021 | 081 | 000 | 044 | 028 | 005 | 001 | 000 | 000 | 001 | 011 | 012 | 023 | 034 |
| F03 | VISUAL | 022 | 000 | 084 | 028 | 011 | 012 | 023 | 008 | 000 | 000 | 005 | 011 | 012 | 003 |
| F04 | HISTORY | 127 | 044 | 028 | 342 | 043 | 012 | 024 | 048 | 007 | 008 | 081 | 120 | 135 | 037 |
| FOSTER/HOROWITZ | | | | | | | | | | | | | | | |
| H01 | BRAZELTON | 044 | 028 | 011 | 045 | 071 | 007 | 005 | 011 | 002 | 002 | 012 | 015 | 004 | 026 |
| PETERSON | | | | | | | | | | | | | | | |
| P01 | PETERSON | 021 | 005 | 012 | 012 | 007 | 050 | 005 | 000 | 000 | 001 | 005 | 007 | 009 | 003 |
| ETZEL | | | | | | | | | | | | | | | |
| Z01 | STELLA | 022 | 001 | 023 | 024 | 005 | 005 | 053 | 011 | 001 | 000 | 003 | 005 | 007 | 002 |
| Z02 | AANGEENBRUG | 048 | 000 | 008 | 048 | 011 | 000 | 011 | 051 | 005 | 001 | 002 | 006 | 006 | 003 |
| LEBLANC | | | | | | | | | | | | | | | |
| L01 | BAXTER | 006 | 000 | 000 | 007 | 002 | 000 | 001 | 005 | 007 | 000 | 001 | 000 | 001 | 001 |
| COOPER | | | | | | | | | | | | | | | |
| C01 | SOCIAL | 006 | 001 | 000 | 008 | 002 | 001 | 000 | 001 | 000 | 024 | 001 | 003 | 004 | 000 |
| EMBRY | | | | | | | | | | | | | | | |
| E01 | CIC | 025 | 011 | 005 | 081 | 012 | 005 | 003 | 002 | 001 | 001 | 084 | 084 | 048 | 007 |
| C02 | PARXCHILD | 031 | 012 | 011 | 120 | 015 | 007 | 005 | 006 | 000 | 003 | 084 | 127 | 076 | 008 |
| E03 | OTHER | 022 | 023 | 012 | 135 | 004 | 009 | 007 | 006 | 001 | 004 | 048 | 076 | 158 | 005 |
| ROGERS-WARREN | | | | | | | | | | | | | | | |
| R01 | LANGUAGE | 028 | 034 | 003 | 037 | 026 | 003 | 002 | 003 | 001 | 000 | 007 | 008 | 005 | 096 |

## Table 14

### STATUS REPORT: EARLY CHILDHOOD INSTITUTE DATA BASE MANAGEMENT SYSTEM

### June, 1982

| Investigator | Project IDS | Problem | Status | Programmer | Documentation In Office | Computer | Comments |
|---|---|---|---|---|---|---|---|
| Allen/Ruggles | --- | Analysis of child/teacher Interactions | Cancelled | --- | --- | --- | Will probably not be included in data base since data center on teachers and not on children |
| Baer | --- | NONE | | --- | --- | --- | |
| Cooper | C01 | Categorization and classification of activity types | Completed | Moore | Package | Honeywell | |
| | C01 | Data entry (8 year backlog) | In progress | Moore/Sears/ Miller/ Watson | Completed | Honeywell | |
| | C01 | Data check program | Completed | Moore/Sears/ Ruggles | Completed | Honeywell | |
| | C01 | Initial data summary (by child) | In progress | Moore/Sears/ Finney | Too early | Honeywell | |
| | C01 | Across-child summarizations | In progress | Sears/ Finney | Too early | Honeywell | |
| Embry | E01 | Community interaction checklist--Data entry | Completed/ Ongoing | Grant/ Sears | Yes | PDP | |
| | E01 | Community interaction checklist: Summarization procedures | Completed/ Revised 6-81/ Ongoing | Foster/ Grant/ Sears | Completed | PDP | |
| | E01 | Community interaction checklist: Additional tables | Preliminary | Lerner/ Sears | Completed | PDP | Lynn has mentioned that she might like more of data analyzed |
| | E02 | *Observation data-data | Completed | Fitzmorn's/ Owen/Sears | Completed | PDP | |

| Investigator | Project IDS | Problem | Status | Programmer | Documentation In Office | Computer | Comments |
|---|---|---|---|---|---|---|---|
| Embry (cont.) | E04 | Parent Descriptive Data entry/report | Completed | Grant | Yes | PDP | |
| | E02 | *Observation data: occurrence & nonoccurrence reliability | occ.-complete nonoc.-in process (other grant) | Sears | Partial | PDP | |
| | E02 | *Observation data: summary counts and summary files | Complete | Sears | Complete | PDP | |
| | E02 | *Observation data: summary input program for backlog data | Program designed | Sears | --- | PDP | Needed Spring, 1981 |
| | E01<br>E02<br>F04 | Child history analysis | Entry complete | Foster/ Grant | | PDP | Ready for analysis Spring, 1982 |
| | | Intercorrelations among data | Preliminary discussions | Marquis | | --- | |
| Etzel/Stella | Z01 | Initial analyses of visual scanning data | Completed/ ongoing | Stella/ Moore | Yes | Honeywell | |
| | Z01 | Additional analyses of visual scanning data | Completed/ ongoing | Moore/ Stella | In progress | Honeywell | |
| w/ Aangeenbrug | Z02<br>F01 | Learning assessment and IQ | Program completed-repeated analysis | Grant | Yes/SPSS | Honeywell | |
| | Z02<br>F01 | Test data table | Completed | Grant | --- | PDP | |
| | Z02<br>F01 | Requests for IRP information | Completed | Grant | Yes | PDP | |

| Investigator | Project IDS | Problem | Status | Programmer | Documentation In Office | Computer | Comments |
|---|---|---|---|---|---|---|---|
| Foster | | Data transfer between Honeywell/PDP | Completed | Finney/ Owen | --- | PDP | |
| | | Data transfer across Institutes | Cancelled | Owen | --- | --- | |
| | | General data entry fever data | Completed | Lerner | Yes | PDP | |
| Foster w/ Peterson | F01<br>F02<br>F03<br>F04<br>P01<br>C01<br>H01 | Relationship between test data and social behavior | Completed | Foster | --- | PDP | |
| w/Others | Z01<br>F03 | Relationship between visual acuity/attending | Completed | Foster | --- | PDP | |
| | H01<br>F01<br>F02<br>F04 | Longitudinal follow-up of children in Horowitz Sample | Completed | Foster | Package | Both | |
| | P01<br>C01 | Relationship of social behavior across settings | Cancelled | Foster | | PDP | Too few subjects for analysis |
| | H01 | Input - Brazelton data | Completed | Grant | --- | Both | |
| | F01 | Input - Stanford-Binet | Completed | Grant | Yes | PDP | |
| | F02 | Input - Bayley | Completed | Grant | Yes | PDP | |
| | F03 | Input - Visual acuity | Completed | Grant | Yes | PDP | |
| | F04 | Input - Child history | IRP set Completed | Grant | In process | PDP | |
| | all | Test analyses | Completed | Foster/ Grant | --- | all | Required transfer to California site |

| Investigator | Project IDS | Problem | Status | Programmer | Documentation In Office | Computer | Comments |
|---|---|---|---|---|---|---|---|
| Guess | G01<br>F02 | Infant Assessment - output tables | Completed | Grant | | | No computer input-Bayley reports only |
| | G01<br>F02 | Validation of Motor Assessment - output tables | Completed | Grant | | | No computer input-Bayley reports only |
| Horowitz for others w/Sullivan | R01<br>H01 | Select subjects from sample for Rogers-Warren/Embry | Completed | Martha Owen | --- | Honeywell | |
| | R01<br>H01 | Scoring assessment scale for Horowitz | Completed | Rod Owen | --- | Honeywell | |
| LeBlanc-Baxter | L01 | Data entry and print-out (Datamyte) | Completed | Moore | Completed | Honeywell | |
| | L01 | Reliability | Completed | Moore | Completed | Honeywell | |
| | L01 | Frequency Summaries | Completed | Moore | Completed | Honeywell | |
| | L01 | Graphic display | Completed | Norcross | In process | Honeywell | |
| Peterson | P01 | Data entry | Completed | Grant | Yes | PDP | |
| | | Cumulative daily summary | Completed | Grant | --- | PDP | |
| | | Two day summary | Completed | Martha Owen | Yes | PDP | |
| | | Data display/analysis-50 tables | Completed | Foster | --- | --- | |
| | | Additional tables | Completed | Grant/Sears | --- | PDP | |
| | | Statistical analysis | Completed | Grant/Havlicek | Partial | Both | |
| | | Final analyses/consultation | Completed | Grant | --- | Both | |

| Investigator | Project IDS | Problem | Status | Programmer | Documentation In Office | Computer | Comments |
|---|---|---|---|---|---|---|---|
| Rogers-Warren | R01 | Context Code | Completed | Owen/Sears | No | PDP | Done for another grant |
| | | Mother-child interaction preliminary design | NA | Owen/Lerner | Yes | PDP | Included because of amount of energy included at early stages |
| | | Mother-child interaction data entry | Completed | Owen/Lerner | Partial | PDP | |
| | | Mother-child interaction reliability | Completed | Bolan/ Lerner | Partial | PDP | |
| | | Mother-child contingency analysis | Completed | Bolan/ Lerner | Partial | PDP | |
| | | Mother-child syntax analysis | Completed | Sears | --- | PDP | |
| | | Mean Length Utterance analysis | Completed | Bolan/ Sears | Partial | PDP | |
| | | Utterance Select | Completed | Bolan/ Sears | Partial | PDP | |
| | | Mother-child statistical analysis | Completed | Sears/ Marquis | --- | PDP | |
| | | SPP verbatum transcript analysis--switch to new system | Completed | Owen/Sears | --- | PDP | Done for another grant |
| | | Individual child summaries (Set 1 - 16 per subject) | Completed | Sears | In progress | PDP | |
| | | Set 1 tables - Individual child summaries (16 per subject) | Completed | Sears | In progress | PDP | |
| | | Set 2 tables - Group summaries by MLU (7 intervals X 2 groups) | Completed | Sears | In progress | PDP | |

| Investigator | Project IDS | Problem | Status | Programmer | Documentation In Office | Computer | Comments |
|---|---|---|---|---|---|---|---|
| Rogers-Warren (cont.) | | Set 3 tables - Group means by MLU | Completed | Sears | In progress | PDP | |
| | | Set 4 tables - Group summaries by age | Completed | Sears | In progress | PDP | |
| | | Set 5 tables - Group means by age | Completed | Sears | In progress | PDP | |
| | | Computer graphics (above analyses) | Completed | Finney | Too early | PDP | |
| | R03 | Subject Descriptive File | Completed | Grant | Yes | PDP | |

## INTEGRATIVE RESEARCH PARAMETERS

### QUESTION A: WHAT ARE THE RELATIONSHIPS THAT EXIST AMONG VARIABLES WITHIN THE DATA BASE SYSTEM?
(Investigator: Foster)

A primary purpose for the collection of psychometric assessment information is to obtain descriptive information on subjects that communicates to others what these subjects are like (Evans & Nelson, 1977). This same information can also be examined to see if experimental variables are related systematically to items, subtests, or total scores of traditional assessments. Relationships between the standardized tests, the amount of cooperative play that children engage in, and the types of children that they play with has been determined through the data base.

The amount of interaction among children can be seen as an indication of acceptance. The degree to which a child plays with or around others is one reflection of how that child accepts others. Similarly, the degree to which this first child is accepted by others is reflected in whether the others seek out, or perhaps even tolerate the original child. In analyzing the factors that contribute to cooperative and parallel play among children, an important variable to consider is the child's intellectual level as determined by norm-referenced instruments.

### STUDY 1: WHAT IS THE RELATIONSHIP BETWEEN SCORES ON THE STANDFORD-BINET AND THE PERCENTAGE OF TIME THAT HANDICAPPED SUBJECTS PLAY COOPERATIVELY WITH NORMAL PEERS IN PRESCHOOL FREEPLAY TIME?
(PIs: Foster, Peterson, and Grant)

Purpose. This study examines the relationships between intelligence and play behavior of both normal and handicapped children within a preschool setting. It has the following specific aims:

1. Determine the IQ and Mental Age of children within the study on cooperative play (see Dr. Peterson, Ecological Guides to Intervention).

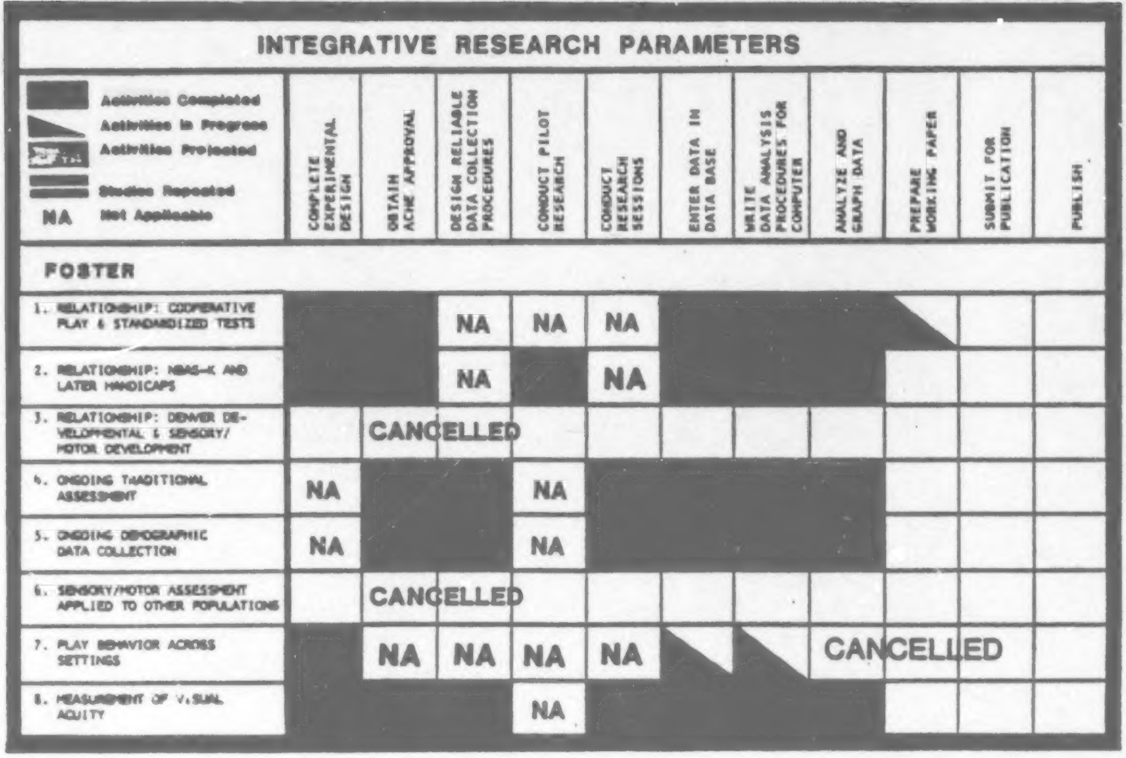
2. Determine the relationships between these sets of variables:
   a. IQ and Cooperative Play; MA and Cooperative Play
   b. IQ and Parallel Play; MA and Parallel Play
   c. IQ and No Play; MA and No Play

   for normal and handicapped children separately, and then combined.

3. Determine if these relationships are affected by sex of the subjects.

Subjects. Twenty subjects have data on both intellectual functioning and their play behavior in Dr. Peterson's integrated preschool. Of these 20 subjects, 6 were normal and 14 handicapped. There were 13 males and 7 females. Dr. Peterson also had 16 subjects (8 normal, 8 handicapped; 6 males, 10 females) for whom no psychometric data are available. The mean IQ for those subjects was 80.2, and the mean Mental Age was 4 years 8 months.

# PROGRESS CHART FOR RESEARCH STUDIES



## INTEGRATIVE RESEARCH PARAMETERS

■ Activities Completed
◣ Activities in Progress
▨ Activities Projected
═ Studies Repeated
NA Not Applicable

| | COMPLETE EXPERIMENTAL DESIGN | OBTAIN ACHE APPROVAL | DESIGN RELIABLE DATA COLLECTION PROCEDURES | CONDUCT PILOT RESEARCH | CONDUCT RESEARCH SESSIONS | ENTER DATA IN DATA BASE | WRITE DATA ANALYSIS PROCEDURES FOR COMPUTER | ANALYZE AND GRAPH DATA | PREPARE WORKING PAPER | SUBMIT FOR PUBLICATION | PUBLISH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **FOSTER** | | | | | | | | | | | |
| 1. RELATIONSHIP: COOPERATIVE PLAY & STANDARDIZED TESTS | ■ | ■ | NA | NA | NA | ■ | ■ | ■ | ◣ | | |
| 2. RELATIONSHIP: NBAS-K AND LATER HANDICAPS | ■ | ■ | NA | ■ | NA | ■ | ■ | ■ | | | |
| 3. RELATIONSHIP: DENVER DEVELOPMENTAL & SENSORY/MOTOR DEVELOPMENT | | CANCELLED | | | | | | | | | |
| 4. ONGOING TRADITIONAL ASSESSMENT | NA | ■ | ■ | NA | ■ | ■ | ■ | ■ | | | |
| 5. ONGOING DEMOGRAPHIC DATA COLLECTION | NA | ■ | ■ | NA | ■ | ■ | ■ | ■ | | | |
| 6. SENSORY/MOTOR ASSESSMENT APPLIED TO OTHER POPULATIONS | | CANCELLED | | | | | | | | | |
| 7. PLAY BEHAVIOR ACROSS SETTINGS | ■ | NA | NA | NA | NA | ◣ | ◣ | CANCELLED | | | |
| 8. MEASUREMENT OF VISUAL ACUITY | ■ | ■ | ■ | NA | ■ | ■ | ■ | ■ | | | |

FIGURE 75

Settings. The setting for obtaining the observational data on play behavior are described in detail under Dr. Peterson's research. Briefly, subjects were observed in a preschool setting. Seven different areas within the rooms were defined as being appropriate for free play activities: Tablework, Art, Physical Education, Kitchen, Manipulative Play, Free Choice, and Miscellaneous.

Standardized testing was done in individual rooms adjacent to the preschool. They were sound-insulated and appropriate for testing, therapy or training of young children. Each room had child-size furniture. A few (approximately 10%) were given in the child's home.

Procedures/Data Collection. The Stanford-Binet Intelligence Scale was administered by three advanced graduate students in Clinical Psychology. The tests were administered and scored according to standardized procedures. A more detailed description is given under Study 4 of this section.

Observation of social behavior was conducted in the classroom according to a well-defined protocol described in detail under Dr. Peterson's research. The observation code was developed to analyze social behavior of children in classroom settings. It used 30-second time intervals and included these observational variables:

Play area: location in the classroom
Available playmates: an indication if the children available during an interval are handicapped, non-handicapped, or a combination
Type of interaction: the type of play that a child was engaged in
Playmate selection: the type of peer(s) with whom the observed subject came into contact when engaging in nonisolate play

A complete description of this code can be found in the Peterson Preschool Observational System for Social Interaction (1978).

Results. Table 15 presents the Pearson product moment correlations between the play behavior of preschool children and their Mental Ages and IQ scores on the Stanford-Binet. Total interaction (i.e., any parallel play or cooperative play) was significantly related to IQ score ($r = .506$, $t = 2.488$, $p < .05$). This was the only measure that correlated with IQ. However, most interaction measures were significantly correlated with Mental Age. This includes positive correlations with total cooperative play; interactions (cooperative and parallel play) with normal children; all interactions with handicapped children; interactions with both handicapped and normal children; cooperation when only normal children were present; cooperation when only handicapped children were present; cooperation when both normal and handicapped children were present; and total interaction. Mental Age was inversely related to Solitary Play.

The means and standard deviations for this group are given in Table 16.

## Table 15

## Pearson Product Moment Correlations Between Intelligence Measures and Measures of Play Behavior in an Integrated Preschool (Dr. Peterson)

| | IQ | MA |
|---|---|---|
| No Play | -.408 | -.014 |
| Cooperative Play | .357 | .704** |
| Solitary Play | -.134 | -.452* |
| All interactions (normal children) | .269 | .514* |
| All interactions (handicapped children) | .155 | -.370 |
| All interactions (combination) | .376 | .555* |
| Cooperation (normal children) | .430 | .553* |
| Cooperation (handicapped children) | -.002 | .447* |
| Cooperation (combination) | .412 | .645** |
| Total Interactions | .506* | .476* |

*p < .05

**p < .001

## Table 16

## Means and Standard Deviations for Measures of Intelligence and Play Behavior

| | Mean | Standard Deviation |
|---|---|---|
| IQ | 80.2 | 27.81 |
| MA | 48.65 mos. | 14.22 |
| No play | 14.98% | 8.26 |
| Cooperative play | 2.26% | 2.65 |
| Solitary play | 41.61% | 8.37 |
| All interactions (normal children) | 17.22% | 7.56 |
| All interactions (handicapped children) | 19.30% | 5.84 |
| All interactions (combination) | 7.86% | 4.30 |
| Cooperation (normal children) | 1.82% | 2.77 |
| Cooperation (handicapped children) | 2.50% | 3.94 |
| Cooperation (combination) | 2.52% | 3.07 |
| Total Interactions | 40.40% | 8.98 |

### Findings

1. The Mental Age was significantly related to most measures of interaction while IQ was related to very few.

2. There was essentially a zero correlation between Mental Age and the proportion of time the children spent in No Play. The relationship between No Play and IQ is just short of being significant. However, if a partial correlation is obtained between these two variables, controlling for Mental Age, then there is a significant inverse relationship between No Play and IQ ($r = -.462$, $p < .05$). This indicates that as IQ increases the amount of time engaged in No Play decreases, if the effect of Mental Age is partialled out. The variable of Mental Age depresses the correlation between IQ and No Play.

3. There was essentially a zero correlation between IQ and cooperation given only handicapped children. In other words, IQ did not affect cooperation when only handicapped children were present. However, the relationship between cooperation given only handicapped children and Mental Age was significant.

### Future Research

1. Analysis of these same correlations for each play area to see if the same relationships are found in areas emphasizing academic skills (e.g., table work) as compared to motor skills (e.g., physical education). This analysis is expected to be completed in the Fall of 1982.

### STUDY 2: WHAT IS THE RELATIONSHIP BETWEEN INFANTS' SCORES ON BRAZELTON (NBAS-K) ITEMS AND THEIR BEING IDENTIFIED AS HANDICAPPED AT THE AGE OF THREE (OR FOUR, OR FIVE)? (PI: Foster with Horowitz)[1]

Purpose. For several years, Dr. Horowitz and her colleagues have collected neonatal data on a large number of infants in the Lawrence/Kansas City area. Many of these children have participated as subjects in other Institute studies, including those on mothers and their language-learning children and interactions between families and their children.

The inclusion of children in multiple studies over extended periods has allowed analysis of how variables measured early in the child's life are systematically related to later standardized measures of children's competence. The IRP data base allows comparison of neonatal data, specifically the Kansas version of the Brazelton (NBAS-K) with the Bayley

---

[1] Dr. Horowitz was out of the country at the time of this report and has not seen this analysis. She kindly allowed me to assess her data, but any misinterpretations or errors are solely the responsibility of Investigator Foster.

Scales of Development and the Stanford-Binet Intelligence Test. The purpose of this research has been to determine the relationship among these measures.

Subjects. Seventy-one subjects have data on the NBAS or the Kansas adaptation, the NBAS-K, and at least one other project within the IRP data base. Table 17 indicates the number of subjects shared with each project. This includes 36 males and 35 females, ranging in chronological age (as of December, 1981) from 2 years 7 months to 10 years 8 months. Chronological age at the time of the data collection may have been several years younger.

These 71 subjects have a variety of measures available regarding their birth and delivery. The Apgar scores at 1 minute after birth ranged from 3 to 10, and at 5 minutes from 7 to 45. Table 18 shows the distribution of Apgar scores. Of the 44 infants whose type of delivery was indicated, 17 (38.6%) were delivered with the use of forceps. The mean length of labor was 9.3 hours with a range from 3 hours to 28 hours. (There were data for 33 or 46.5% on length of labor.) The average age of the mother at delivery was 25.8 years (range 16 to 35 years; 40 respondents). Father's age was an average of 26.1 years (range 19 to 38 years; 34 respondents).

Data Collection. Standardized procedures were used for all assessments. The NBAS-K was administered in the hospital by trained graduate students, within a few days of birth of the subject infants. (The NBAS evaluates the best performance of the infant on a number of different behaviors.) The NBAS-K obtains this same information but also evaluates the modal (or typical) behavior of the newborn infant as shown on the data sheet, Figure 76. A difference score between the infants' best and modal behavior on 12 critical items is used to determine a summary difference score for each child. All three of these NBAS-K measures (modal, best, and difference) have been correlated with scores on later psychometric evaluations.

Assessments using the Stanford-Binet Intelligence Scale and the Bayley Scales of Infant Development were administered by three advanced graduate students in Clinical Psychology. The Bayley Scales were also administered by a trained doctoral candidate in Special Education. The choice of scales was determined by consideration of the child's age and developmental maturity. Children with no serious disabilities and apparently average development were given the test most appropriate for their age (i.e., Bayley for 0-2½ years and Stanford-Binet from 2½ years onward).

Numerous other children, however, required additional consideration. These children had disabilities severe enough to preclude accurate assessment based on the standardized test and norms corresponding to their age. For example, 10-15% of the children tested in this sample were too old for the Bayley and, yet, were unable to establish a basal level of the Stanford-Binet. If a child is older than 2½ years and does not establish a basal level by passing all the items at any one age on the Stanford-Binet, one cannot determine an IQ score. These children thus

### Table 17

| Investigator | IRP Project | Number of Subjects |
|---|---|---|
| Foster | Stanford-Binet | 44 |
| Foster | Bayley | 28 |
| Foster | Visual Acuity | 11 |
| Foster/Embry | Child History | 45 |
| Etzel/Stella | Learning Assessment | 5 |
| Etzel/ Aangeenbrug | Learning Assessment | 11 |
| Peterson | Social Behavior | 7 |
| Rogers-Warren | Language | 26 |
| Cooper | Social Behavior | 2 |
| Embry | Community Interaction | 12 |
| Embry | Observation | 15 |

Table 18

Apgar scores at 1 and 5 minutes for subjects with data on the Brazelton and at least one other DBMS project.

| | 1 minute | | 5 minutes | |
|---|---|---|---|---|
| Score | N | % | N | % |
| 10 | 3 | 4.2 | 45 | 63.4 |
| 9 | 35 | 49.3 | 8 | 11.3 |
| 8 | 15 | 21.1 | 2 | 2.8 |
| 7 | 2 | 2.8 | 3 | 4.2 |
| 6 | 0 | 0 | 0 | 0 |
| 5 | 1 | 1.4 | 0 | 0 |
| 4 | 0 | 0 | 0 | 0 |
| 3 | 3 | 4.2 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| Not reported | 12 | 16.9 | 13 | 18.3 |

## Neonatal Behavioral Assessment Scale
## KU Infant Lab Experimental Form No. 1

Infant's Name________________________________ Date____________________

| Scale Items | Best | R | +/- | Modal | R | +/- |
|---|---|---|---|---|---|---|
| 1. Response decrement to light (1,2,3) | | | | | | |
| 2. Response decrement to rattle (1,2,3) | | | | | | |
| 3. Response decrement to bell (1,2,3) | | | | | | |
| 4. Response decrement to pinprick (1,2,3) | | | | | | |
| *5. Orientation inanimate visual (4) | | | | | | |
| *6. Orientation inanimate auditory (4,5) | | | | | | |
| *7. Orientation animate visual (4) | | | | | | |
| *8. Orientation animate auditory (4,5) | | | | | | |
| *9. Orientation animate visual & auditory | | | | | | |
| 10. Alertness (4) | | | | | | |
| 11. General tonus (4,5) | | | | | | |
| 12. Motor maturity (4,5) | | | | | | |
| 13. Pull-to-sit (3,4,5) | | | | | | |
| 14. Cuddliness (4,5) | | | | | | |
| *15. Defensive movement (3,4,5) | | | | | | |
| *16. Consolability (6 to 5,4,3,2) | | | | | | |
| 17. Peak of excitement (6) | | | | | | |
| 18. Rapidity of buildup (from 1,2 to 6) | | | | | | |
| 19. Irritability (3,4,5) | | | | | | |
| 20. Activity (alert states) | | | | | | |
| 21. Tremulousness (all states) | | | | | | |
| 22. Startle (3,4,5,6) | | | | | | |
| 23. Lability of skin color (1 to 5 & 6) | | | | | | |
| 24. Lability of state (all states) | | | | | | |
| 25. Self-quieting activity (from 5 & 6 to 4-1) | | | | | | |
| 26. Hand-mouth facility (all states) | | | | | | |
| 27. Smiles (all states) | | | | | | |
| *28. Inanimate visual & auditory (4) | | | | | | |
| 29. Quality of infant's responsiveness | | | | | | |
| 30. Examiner persistence | | | | | | |
| 31. General irritability | | | | | | |
| 32. Reinforcement value of infant behavior | | | | | | |

*Score characteristic & best behavior

Figure 76

required testing on the Bayley. However, since the norms of the Bayley only extend to 2½ years it is impossible to obtain precise estimates of a child's developmental index beyond this age. Naglieri (1981) provides a description of how extrapolated indices can be obtained for low raw scores, but warns that they are not empirically based.

From the standpoint of developing an accurate data base this circumstance obviously presents certain difficulties. Since neither a developmental index nor IQ score can be determined in these cases, a notation was recorded in the data files to indicate the deviation from normal testing procedures and result determination. Similar considerations were afforded to other children with disabilities such as blindness, deafness, and cerebral palsey. In general, whenever a child's score, or lack thereof, was affected by a disability this notation was made in the file.

Results and Discussion. NBAS-K data, including best, modal, and difference scores were available for 26 subjects (13 males and 13 females). The means and standard deviations for each of these scores is given below:

| | Best | Modal | Difference |
|---|---|---|---|
| Mean | 46.4 | 36.73 | 9.69 |
| Standard deviation | 7.96 | 9.14 | 4.10 |

Of these 26 subjects, 16 also had Stanford-Binets and 18 had Bayleys. Nine subjects had the NBAS-K, the Bayley and the Stanford Binet.

Correlations between each of the NBAS-K scores were obtained with the Bayley MDI and PDI and the Stanford-Binet IQ. Table 19 presents the values obtained for each set of subjects for whom data was available on the two scales being compared.

The NBAS-K difference score had a significant inverse correlation with the Stanford-Binet IQ. That is, the degree to which the best and the modal scores were the same (low difference) predicts higher IQ scores. The Bayley Mental Index was also significantly, positively correlated with IQ, but the Bayley and the NBAS-K were not correlated. Both of the significant correlations accounted for a small part of the variance (about 16 to 30%). Since there is little correlation between the NBAS-K and the Bayley, it is possible that the two tests given during early childhood may be predictive of intellectual functioning of preschool children.

The small number of subjects in this study permits neither a factor analysis nor a discriminant analysis. However, these results indicate that a more systematic, larger-scale analysis may be fruitful. Also, with a larger number of subjects it would be useful to determine how NBAS-K items are related to later intellectual development, while covarying maternal intelligence and age.

388

## Table 19

Correlations between standardized assessment procedures

(A) NBAS-K and Bayley Scales N=18

| | | MDI | PDI | Mean |
|---|---|---|---|---|
| | Best | .253 | .002 | 46.94 |
| NBAS-K | Modal | .288 | -.026 | 37.78 |
| | Difference | -.182 | .053 | 9.17 |
| | Mean | 119.44 | 106.33 | |

(B) NBAS-K and Stanford-Binet IQ N=16

| | | IQ | Mean |
|---|---|---|---|
| | Best | .0004 | 46.63 |
| NBAS-K | Modal | .1648 | 36.69 |
| | Difference | -.414* | 9.94 |
| | Mean | 100.81 | |

(C) Bayley and Stanford-Binet IQ N=19

| | | IQ | Mean |
|---|---|---|---|
| | MDI | .543* | 113.32 |
| BAYLEY | PDI | .264 | 99.84 |
| | Mean | 100.72 | |

*p< .05, one-tail

## Findings

1. A significant correlation was found between the difference score on the NBAS-K and the IQ on the Stanford-Binet.
2. A significant correlation was found between the Bayley Mental Index (MDI) and the Stanford-Binet IQ score.
3. There was almost no correlation between the MDI and the NBAS-K scores. This fact may indicate that the NBAS-K difference score and the MDI together may be predictive of IQ scores in preschoolers.

## Future Research

1. Replicate with larger numbers.
2. Examine the relationship between items on the NBAS-K and later IQ through discriminant analysis.
3. Determine if the correlations were affected by sex or gestational age of the infant.

## INTEGRATIVE RESEARCH PARAMETERS

### QUESTION B: WHAT ARE THE PERSONAL AND DEMOGRAPHIC CHARACTERISTICS OF CHILDREN AND THEIR FAMILIES WHO ARE USED AS SUBJECTS IN INSTITUTE RESEARCH? (Investigator: Foster)

Institute investigators have emphasized behavioral observations for assessing and intervening with children at risk. Nevertheless, traditional descriptive information on these subjects and their families is useful for describing them to others, and for analyzing relationships between these variables and the behavioral ones investigated by the Institute. Therefore, this line of research has been taken by the Institute.

### STUDY 4: HOW DO CHILDREN SERVING AS SUBJECTS IN INSTITUTE RESEARCH SCORE ON TRADITIONAL PSYCHOMETRIC TESTS (Bayley Scales of Infant Development, Stanford-Binet)? HOW DO THESE SCORES CHANGE OVER TIME? (PI: Foster, Grant)

Purpose. Although the emphasis of the Institute has been behavioral assessment, there was a need for an auxiliary program of traditional or psychometric assessment to accompany the behavioral assessment and intervention strategies developed by the Institute.

The purpose of this study was to:

1) describe the research population in standardized terms that would be informative to individuals interested in this research;
2) examine changes in results of psychometric assessment over time; and
3) examine the relationship between results on the Stanford-Binet and the Bayley Scales.

Subjects. One hundred fifty subjects were given Stanford-Binet tests and 79 were given the Bayley Scales of Infant Development (BSID). The number of these subjects who had data within each of the other projects within the IRP data base are given in Table 20. Subjects were selected for testing, either by referral by other Institute investigators or because they were students in one of the preschool programs associated with the Institute. In all cases parental permission was obtained prior to each test administration.

Settings. Standardized testing was done in individual rooms adjacent to the preschool or in the child's home. The individual rooms were sound-insulated and appropriate for testing, therapy, or training of young children. Each room had child-size furniture. Testing done in the home was done in an area relatively free from distraction. For the Bayley Scales the mother or teacher was frequently present, especially for younger children.

Approximately 80% of the Bayley administrations were given at the child's home. The remainder of these administrations were done at the University of Kansas Medical Center, Swinney School in Kansas City, and

## Table 20

**Number of Subjects with Standardized Assessment Data and Data in other ECI Projects:**

|  | Number of Subjects with Stanford-Binet | Visual Acuity | Child History | Brazelton | Social: Cooper | Social: Peterson | Learning Assessment Etzel & Stella | Learning Assessment: Etzel & Aangeenbrug | Mother/ Child Language | Community Interactions |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of Subjects with BSID Data | 19 | 0 | 43 | 28 | 1 | 5 | 0 | 0 | 34 | 11 |
| Number of Subjects with Stanford-Binet Data | -- | 22 | 127 | 46 | 5 | 20 | 22 | 48 | 27 | 25 |

Haworth Hall at the University of Kansas. The vast majority of Stanford-Binet assessments were performed in and around various preschool classrooms at the University of Kansas. Approximately 10% of these administrations occurred at the child's home.

Procedures/Data Collection. Assessments using the Stanford-Binet Intelligence Scale and the Bayley Scales of Infant Development were administered by three advanced graduate students in Clinical Psychology. The Bayley Scales were also administered by a trained doctoral candidate in Special Education. The choice of scales was determined by consideration of the child's age and developmental maturity. Children with no serious disabilities and apparently average development were given the test most appropriate for their age (i.e., Bayley for 0-2½ years and Stanford-Binet from 2½ years onward).

Numerous other children, however, required additional consideration. These children had disabilities severe enough to preclude accurate assessment based on the standardized test and norms corresponding to their age. For example, 10-15% of the children tested in this sample were too old for the Bayley and, yet, were unable to establish a basal level of the Stanford-Binet. If a child is older than 2½ years and does not establish a basal level by passing all the items at any one age on the Stanford-Binet, one cannot determine an IQ score. These children thus required testing on the Bayley. However, since the norms of the Bayley only extend to 2½ years it is impossible to obtain precise estimates of a child's developmental index beyond this age. Naglieri (1981) provides a description of how extrapolated indices can be obtained for low raw scores, but warns that they are not empirically based.

From the standpoint of developing an accurate data base this circumstance obviously presents certain difficulties. Since neither a developmental index nor IQ score can be determined in these cases, a notation was recorded in the data files to indicate the deviation from normal testing procedures and result determination. Similar considerations were afforded to other children with disabilities such as blindness, deafness, and cerebral palsey. In general, whenever a child's score, or lack thereof, was affected by a disability this notation was made in the file.

Results.

A. Comparison across projects

1. Bayley Scales of Infant Development. Eighty-one subjects obtained raw scores on the mental scale of the BSID, and 44 of these subjects were of the appropriate age for deriving developmental indices (MDI).[1] The average raw score was 115 and the average MDI was 111. Only data for the first test administration are presented.

---

[1] The BSID scales have a mean of 100 and a standard deviation of 16.

Since raw scores need to be interpreted within the context of age, they are not presented in Table 21. Because appropriate indices were not available, the following subjects were not included in this analysis: subjects older than 30 months, subjects who fell below 50 on the mental or motor index, and/or subjects whose sensory impairment affected test results. Therefore, Table 21 is biased in favor of normal subjects within the data base.

On the motor scale, 48 subjects had raw motor scores for a mean of 50, and a Physical Development Index (PDI) could be derived for 43 of these subjects. The mean PDI was 102.[1] Table 21 summarizes this information and presents corresponding data for each project with 10 or more subjects for whom BSID scores are available.

The mean MDI was generally higher than the norm mean, and the mean PDI was very close to norm mean. However, as the mean MDI increased, the mean PDI increased also. Scores of most project subjects were equivalent to the entire DBMS, except for those in Dr. Embry's project which were lower on both the mental and the motor scales.

2. Stanford-Binet Intelligence Scale. Table 22 summarizes the data for the first administration of the Stanford-Binet for all subjects within the data base. For the 150 subjects, the mean Chronological Age (CA) was 4 years 5 months, the mean Mental Age (MA) was 4 years 10 months, and the mean IQ was 102.

   Subjects for whom a basal level could not be obtained do not have IQs or MAs, thus eliminating the most severely handicapped from analysis.

   The mean IQ for each project was fairly close to the mean IQ for the entire data base. Exceptions were for the Visual Acuity Project and the Social Interaction Project of Dr. Peterson. Individuals who also had data on the Bayley Scales tended to be younger, and have correspondingly lower mental ages. Dr. Embry's subjects tended to be somewhat younger also.

B. Changes in test scores over time.

1. Bayley Scales of Infant Development. The Bayley Scales of Infant Development were given 2 or more times to 17 subjects. However, all but one of these had raw scores too low or were too old to allow the derivation of an index. A comparison of raw scores does indicate that this group of severely-to-profoundly handicapped persons acquired skills over time. The mean mental raw score in the first test was 78.12, and the mean on the second test was 85.56. This score represents a very small increase in competence over a mean of 5.24 months between tests. These subjects gained about 1 point (on raw score) per month.

## Table 21

### Mean Mental Development Index and Physical Development Index for the Bayley Scales of Infant Development

(Results are presented for all subjects with indexed scores as well as for each BCI project that had BSID data on at least 10 subjects. Since raw scores need to be interpreted within the context of age, they are not presented. Severely delayed individuals are not included in this analysis since it was not possible to derive an index for their scores.)

|  | N | Mean | N | Mean PDI |
|---|---|---|---|---|
| Subjects with: |  |  |  |  |
| BSID | 44 | 111 | 43 | 102 |
| BSID and Stanford-Binet | 17 | 113 | 17 | 103 |
| BSID and Child History | 22 | 111 | 23 | 101 |
| BSID and Brazelton Data | 26 | 116 | 27 | 104 |
| BSID and Mother/Child Language | 25 | 114 | 26 | 105 |
| BSID and Community Interaction | 11 | 103 | 11 | 97 |

6

## Table 22

Mean, chronological ages (CA), mental ages (MA), and IQs for subjects within the data base and within each project

| | N | Mean CA (Months) | Mean MA (Months) | Mean IQ |
|---|---|---|---|---|
| Subjects with: | | | | |
| Stanford-Binet | 150 | 53 | 58 | 102 |
| BSID | 19 | 35 | 39 | 97 |
| Visual Acuity | 22 | 64 | 61 | 92 |
| Child History | 127 | 52 | 59 | 105 |
| Brazelton | 46 | 48 | 57 | 104 |
| Learning Assessment Etzel/Stella | 22 | 57 | 60 | 100 |
| Learning Assessment Etzel/Aangeenbrug | 48 | 51 | 61 | 108 |
| Social: Peterson | 20 | 58 | 48 | 80 |
| Language | 27 | 48 | 48 | 91 |
| Community Interaction: Embry | 25 | 43 | 52 | 104 |
| Parent Code: Embry | 31 | 46 | 54 | 103 |

2. Stanford-Binet Tests of Intelligence. One-hundred fifty subjects were given the Stanford-Binet at least once; 61 of these subjects had two or more tests, and 22 of the 61 were tested a third time during the 4 years of data collection. The results are presented in Table 23.

Mean IQs for the first and second tests are about the same, with both CA and MA increasing slightly. On the third test, CA and MA are substantially higher, and the IQ has decreased.

Table 24 shows the mean CA, MA and IQ for the 22 subjects to whom all 3 tests were given. These subjects had consistently lower IQs than the entire data base, indicating that subjects who had the Stanford-Binet administered 3 times, tended to be the more retarded individuals in the data base. The correlation between first and second IQ tests was .94 ($p < .001$) and between first and third was .858 ($p < .001$).

A t-test for matched pairs was conducted for 56 subjects with 2 Stanford-Binet tests. The second test was significantly higher than the first test (mean difference = 3.2, $t = 2.38$, $p$ .05, 2-tailed). In order to determine if this increase was due to the recency between tests, a Pearson product moment correlation was run between the length of time between test 1 and test 2 and the change in scores. This correlation was not significant ($r = .018$, NS).

C. Relationship Between Stanford-Binet Test of Intelligence and the Bayley Scales of Infant Development.

There were 19 subjects with scores on both the Stanford Binet and on the Developmental Index of the Bayley. The correlation between these sets of scores was $r = .543$, $t = 2.66$ ($p < .05$) for the Binet IQ and the Mental Index, and $r = .264$, NS for the Binet IQ and the Motor Index.

D. Item Analysis on Bayley Mental Scale.

Eighty-one subjects were given the BSIU at least once. Of these, 55 were less than 30 months, and 26 were older than 30 months. Table 25 provides a brief summary of chronological age, mental age, raw score, and MDI. An analysis was made of the proportion of each group that got credit for each item from 61 to 163 on the Mental Scale. Items that were consistently more difficult across groups (i.e., fewer subjects made correct responses) may be useful items to examine for prediction of developmental delays. Several items (notably 66, 85, and 92) were consistently more difficult than surrounding items, and success on some items appeared to be related to the sex of the subjects. Research, including replication with another sample, is continuing in this area.

## Table 23

Mean, CA, MA, and IQ For Subjects Within the ECI Data Base, For Subjects With at Least 1 Test, at Least 2 Tests, and at Least 3 Tests

| | | Means | | |
|---|---|---|---|---|
| | N | CA (Months) | MA (Months) | IQ |
| Test 1 | 150 | 053 | 058 | 102 |
| Test 2 | 61 | 059 | 063 | 101 |
| Test 3 | 22 | 077 | 072 | 092 |

Table 24

Mean, CA, MA, and IQ for the 22 Subjects Who Were Administered the Stanford-Binet Three Times

| | Means (N = 22) | | |
|---|---|---|---|
| | CA (Months) | MA (Months) | IQ |
| Test 1 | 58 | 53 | 87 |
| Test 2 | 66 | 63 | 95 |
| Test 3 | 77 | 73 | 92 |

## Table 25

### Age, Sex, Mental Age, Raw Score, and Mental Development Index of Subjects To Whom the Bayley Scales Were Administered

| | N | CA | MA | Mental Raw Score | Mental Index |
|---|---|---|---|---|---|
| Females, < 30 months | 24 | 17.25 | 16.00 | 116.38 | 106.45 |
| Males, < 30 months | 31 | 16.81 | 15.26 | 111.84 | 109.44 |
| Females, ≥ 30 months | 15 | 46.40 | 9.20 | 75.40 | -- |
| Males, ≥ 30 months | 11 | 42.82 | 10.50 | 90.89 | -- |

## Findings

1. The mean IQ for the 150 subjects with Stanford-Binet scores was 102 ( Mean Chronological Age = 53; Mean Mental Age = 58).

2. The Mean Mental Development Index for the 44 subjects with Bayley MDI scores was 111; the Mean Physical Development Index for the 43 subjects with PDI scores was 102.

3. Subjects over 30 months for whom a basal level could not be established on the Stanford-Binet were given the Bayley Scales of Infant Development, even though MDIs and PDIs could not be established. There were 26 subjects for whom this was true. There were also 9 subjects who were younger than 30 months but had raw scores too low for the norms to provide an MDI and PDI.

4. The Mental Development Index was typically higher than the Physical Development Index. This was true across projects within the data base.

5. Correlations between repeated tests of the Stanford-Binet were quite high.

6. The Stanford-Binet, the second test, was significantly higher than the first test. The length of time between tests was not related to this increase. Further analysis needs to be done to determine if increases in IQ were related in time to intervention strategies of other investigators.

7. The mean change in Bayley raw scores for severely handicapped individuals was very small: 7.44 over 5 months, and scores of 5 of the 17 subjects decreased during that average time.

8. The correlation between the Bayley MDI and the IQ on the Binet was significant but accounted for a small proportion of the variance. The correlation of IQ with the motor scale was insignificant.

9. Some items on the Bayley Mental Scale appear to be more difficult than surrounding items and to be influenced by sex.

## Future Research

1. Determine how the group with large increases in IQ differed from others. One option is to examine the effect and timing of intervention strategies conducted by other investigators.

2. What BSID items increased or decreased in the severely handicapped subjects? Was there any consistency?

3. Examine which subjects differed from Bayley to Binet on standardized scores. Were some items more predictive than others?

4. Examine the relationships between standardized tests and performance on learning tasks developed by Dr. Etzel and her colleagues. Preliminary analyses shows that performance on the tasks by Dr. Etzel and Ms. Aangeenbrug was significantly related to the Stanford-Binet IQ ($t = 4.62$ $p < .001$) but not to Mental Age ($+ = 1.01$, NS).

5. Replicate Bayley item analysis with another group. Possibly establish differential weighings for items to see if that improves its prediction of later measures of intelligence.

6. Correlate Bayley language items with language measures from Dr. Rogers-Warren.

## STUDY 5: WHAT ARE THE FAMILY AND PERSONAL CHARACTERISTICS OF THE ECI CHILDREN?

(PIs: Foster, Embry with others)

Purpose. This study has obtained descriptive information on characteristics of families of children who participated in Institute research. The primary use of this information is to provide descriptive data on ECI subjects, but it has also been statistically related to other variables within the data base.

### Child History

Subjects. Child history forms were obtained on 221 subjects. Of these, 129 were male and 92 were female. All of the subjects have data in at least one other project. Table 26 shows the number of subjects who share data with each of the data base projects.

Procedures. A standard questionnaire (see Figure 77) was given to parents of children who were participating as subjects in other ECI projects. This included subjects from all of the preschools, as well as the studies concerned with interactions within families (i.e., also Rogers-Warren and Embry).

In some cases, parents could fill out the questionnaire in their own homes, and return them at their convenience. The information was for use by the preschools but, of course, inclusion in the data base was at the discretion of the parents. The individual filling out the questionnaire was the parent or guardian.

In other cases, mainly for subjects in Dr. Embry's studies, a research assistant completed the questionnaire through an interview with the parent or guardian.

## Table 26

Subjects With Child History Data
and Each Additional Data Base Project.
(Subjects may have data in more than one other project.)

| Investigator | Project | Number of Subjects |
|---|---|---|
| Foster | Stanford Binet | 123 |
| Foster | Bayley | 44 |
| Foster | Visual Acuity | 20 |
| Stella/Etzel | Learning Assessment | 20 |
| Aangeenbrug/Etzel | Learning Assessment | 48 |
| Peterson | Social Behavior | 9 |
| Rogers-Warren | Language | 35 |
| Cooper | Social | 5 |
| Horowitz | Brazelton | 46 |
| Embry | Community Interaction | 40 |
| Embry | Family Observation | 47 |

# CHILD HISTORY

Please read and sign one of the spaces below:

1. I have read the attached letter explaining the intended use of the information which I have furnished on this form and consent to having the information included in the Early Childhood Institute's research project. I understand this information will be coded to insure confidentiality.
   Signed ______________________ Date ______________

2. I prefer not to have the information furnished in this form included in the Early Childhood Institute's research project.

   Signed ______________________ Date ______________

---

3. Child's Name ______________________________
4. Child's Address ______________________________
   ______________________________
5. Child's Sex ☐ M ☐ F
6. Home Phone Number ______________________
7. Child's Birth Date ☐ month - ☐ day - ☐ year
8. Date Child first entered preschool ☐ month - ☐ year
9. Mother's Name ____________________ Phone # at work __________
10. Father's Name ____________________ Phone # at work __________

Figure 77

## CHILD'S BIRTH AND DEVELOPMENT INFORMATION

11. Child's Date of Birth ☐ month - ☐ day - ☐ year

12. ☐ yes ☐ no Is this child adopted?

Child's age when adopted: ☐ years - ☐ months

Does child know this? ☐ yes ☐ no

How did the child find out? ____________________

____________________

____________________

13. Birth Weight ☐ lbs. ☐ ozs. (____) Kilograms

14. Type of Birth:

☐ Normal ☐ Forceps ☐ Breech ☐ Low Birth Weight

☐ Induced ☐ Cesarean ☐ Premature ☐ Multiple (twins)

15. Physical/medical problems your child had at birth (e.g., jaundice). (Please specify.) ____________________

____________________

16. How long did your child stay in the hospital when born?

Length of stay: ☐ days - ☐ weeks

Reason(s): ____________________

____________________

17. Length of pregnancy:

☐ 6 months
☐ 6½ months
☐ 7 months
☐ 7½ months
☐ 8 months
☐ 8½ months
☐ 9 months
☐ 9½ months
☐ 10 or more months

18. ☐ yes ☐ no Were there any unusual factors during the pregnancy or birth of your child? (Please specify.) ________________

__________________________________________

__________________________________________

19. ☐ yes ☐ no Was the mother hospitalized during this pregnancy (before birth of child)?

☐ Number of Hospitalizations.

☐ days ☐ weeks Total Time in Hospital.

Reason(s): ________________________________

__________________________________________

20. How long was mother hospitalized at child's birth? ☐ days ☐ weeks

21. How long was labor? ☐ hours

22. ☐ yes ☐ no Did the mother have any other medical problems during pregnancy that did not require hospitalization? (Please specify.) ________________

__________________________________________

23. ☐ yes ☐ no Were there major changes in the home during this pregnancy (e.g., divorce, death of relative, etc.)? (Please specify.)

________________________________________________

________________________________________________

24. ☐ yes ☐ no Was this pregnancy planned?

25. ☐ yes ☐ no Was the father of the child supportive of this pregnancy?

26. ☐ yes ☐ no Were the mother's parents supportive of this pregnancy?

27. ☐ yes ☐ no Were the father's parents supportive of this pregnancy?

28. How would you describe this pregnancy? Circle the number between the two words that best describes the pregnancy.

Example: difficult 1 2 ③ 4 5 6 7 easy

The pregnancy was:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| comforting | 1 | 2 | 3 | 4 | 5 | 6 | 7 | frightening |
| dreaded | 1 | 2 | 3 | 4 | 5 | 6 | 7 | looked forward to |
| calm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | anxious |
| difficult | 1 | 2 | 3 | 4 | 5 | 6 | 7 | easy |
| joyful | 1 | 2 | 3 | 4 | 5 | 6 | 7 | angry |
| depressing | 1 | 2 | 3 | 4 | 5 | 6 | 7 | exciting |
| lonely | 1 | 2 | 3 | 4 | 5 | 6 | 7 | supported |
| reassuring | 1 | 2 | 3 | 4 | 5 | 6 | 7 | frustrating |
| tense | 1 | 2 | 3 | 4 | 5 | 6 | 7 | relaxed |
| happy | 1 | 2 | 3 | 4 | 5 | 6 | 7 | sad |

29. Child's Developmental Milestones Achieved (From your memory.)

| | Behavior | Age in years or months when developed. | | Has not developed this behavior. | Don't know. |
|---|---|---|---|---|---|
| | | years | months | | |
| Motor | Sitting Alone | ☐ | ☐ | ☐ | ☐ |
| | Crawling on all Fours | ☐ | ☐ | ☐ | ☐ |
| | Standing Alone | ☐ | ☐ | ☐ | ☐ |
| | Walking Alone | ☐ | ☐ | ☐ | ☐ |

| | Behavior | Age in years or months at which child first began: | | Has not developed this behavior. | Don't know. |
|---|---|---|---|---|---|
| | | years | months | | |
| Language | Using Words | ☐ | ☐ | ☐ | ☐ |
| | Making Sentences | ☐ | ☐ | ☐ | ☐ |

| | Age in years or months when developed. | | Has not developed this behavior. | Don't know. |
|---|---|---|---|---|
| | years | months | | |
| Self-feeding with Spoon | ☐ | ☐ | ☐ | ☐ |
| Toileting: Bladder Control | ☐ | ☐ | ☐ | ☐ |
| Bowel Control | ☐ | ☐ | ☐ | ☐ |
| Self-dressing (except for shoes and socks) | ☐ | ☐ | ☐ | ☐ |

## MEDICAL INFORMATION

30. What doctor is most familiar with your child? ______________________

Doctor's address: ________________________________________________

31. What is the date of your child's last visit to the doctor:

☐ - ☐
month year

32. Reason for visit (e.g., routine check-up, illness).

(Please specify.) ____________________

33. Check the diseases your child has had. Please indicate approximate date(s).

☐ Measles ____________
☐ Mumps ____________
☐ Whooping cough ________
☐ Middle Ear Infections (Otitis Media) ________
☐ Rheumatic fever ____________
☐ Chicken pox ____________
☐ Pneumonia ____________
☐ Other (specify) ____________

34. Were there any complications with these illnesses, such as high and persistent fever, convulsions, persistent muscle weakness, etc.? (Please specify.)

____________________

35. Has your child ever been hospitalized?

☐ yes ☐ no

☐ Number of Hospitalizations

☐ days ☐ weeks Total Time in Hospital

Reason(s): ____________________

____________________

36. ☐ yes ☐ no Has your child had any other serious injuries or illnesses not involving a hospitalization?

Please specify. ____________________

____________________

37. How many colds has your child had in the last year? ____________

38. Does your child have:

☐ yes ☐ no Allergies?

To foods? (Please specify.) ____________

To animals? (Please specify.) ____________

To medications? (Please specify.) ____________

☐ yes ☐ no Asthma?

☐ yes ☐ no Hayfever?

39. ☐ yes ☐ no Does your child breathe with mouth open most of the time?

40. ☐ yes ☐ no Have tonsils and/or adenoids been removed?

When?

☐ - ☐
month year

41. ☐ yes ☐ no Has your child had any trouble with ears, such as earaches, infections, running ears?

How many times in the last year? ☐

(#41 continued next page)

41. (continued)

☐ yes ☐ no Has your child's hearing been tested?

When? ☐ month - ☐ year

By whom? ____________________

☐ yes ☐ no Was there evidence of hearing loss?

Degree of Hearing Loss:
- Mild ☐
- Moderate ☐
- Severe ☐

42. ☐ yes ☐ no Has your child's vision been tested?

When? ☐ month - ☐ year

By whom? ____________________

☐ yes ☐ no Was there evidence of sight loss?

Degree of Visual Loss:
- Mild ☐
- Moderate ☐
- Severe ☐

43. Does your child have any of the following speech or language problems?

| | | When did you first notice these problems? (Please specify age in months.) |
|---|---|---|
| ☐ | Doesn't talk | ☐ |
| ☐ | Doesn't understand simple instructions | ☐ |
| ☐ | Uses only a few words | ☐ |
| ☐ | Doesn't use sentences | ☐ |
| ☐ | Has difficulty pronouncing words | ☐ |
| ☐ | Other | ☐ |

(Please specify.) ____________________

______________________________

______________________________

44. ☐ yes ☐ no Do you believe your child's speech or language has improved in the last six months?

☐ yes ☐ no Has your child's speech been tested?

When?

☐ - ☐
month year

By whom? ______________________________

Where? ______________________________

☐ yes ☐ no Has your child received any speech therapy?

When?

☐ - ☐
month year

By whom? ______________________________

45. ☐ yes ☐ no Has the child had special physical or other examinations of any kind?

(e.g., psychologist
perceptual motor
short stature
Denver Developmental Screening Test
Bayley Scales of Child Development
EEG's

A. Type: ____________ Date: ____________ Outcome: ____________

B. Type: ____________ Date: ____________ Outcome: ____________

C. Type: ____________ Date: ____________ Outcome: ____________

D. Type: ____________ Date: ____________ Outcome: ____________

E. Type: ____________ Date: ____________ Outcome: ____________

F. Type: ____________ Date: ____________ Outcome: ____________

46. Child's General Health: ☐ Good ☐ Fair ☐ Poor

CHILD CHARACTERISTICS

47. Check and describe your child's special problems.

☐ Vision ____________________

☐ Hearing ____________________

☐ Language ____________________

☐ Orthopedic ____________________

☐ Other Health Impairments ____________________

☐ Retardation ____________________

☐ Emotional/Behavioral ____________________

☐ Learning Disabled ____________________

☐ Other ____________________

☐ No special problems.

48

| Names of serivce programs your child has been or is in: | Approximate dates: | How did you find out or who told you about the program? |
|---|---|---|
| ____________ | ______ | ____________ |
| ____________ | ______ | ____________ |
| ____________ | ______ | ____________ |
| ____________ | ______ | ____________ |

49. In which of the child care services below has your child participated?

| | Past | Currently | Never |
|---|---|---|---|
| Sitter (in Home) | ☐ | ☐ | ☐ |
| Sitter (away from home) | ☐ | ☐ | ☐ |
| Child's Older Brother or Sister as Sitter | ☐ | ☐ | ☐ |
| Day Care Center | ☐ | ☐ | ☐ |

Where & When ____________________

____________________

| | | | |
|---|---|---|---|
| Preschool | ☐ | ☐ | ☐ |

Where & When ____________________

____________________

| | | | |
|---|---|---|---|
| Public School | ☐ | ☐ | ☐ |

Where & When ____________________

____________________

50. Please check your child's behaviors that do concern you:

☐ Restlessness
☐ Thumb-sucking
☐ Clings to mother
☐ Overdependence on adults
☐ Lacks self-confidence
☐ Whining or crying
☐ Hair-pulling or twisting
☐ Jealousy
☐ Hurts others/Aggressive
☐ Fights/Argues Does not get along with others
☐ Submissiveness/Gives in too easily
☐ Destructive of property or materials
☐ Stealing
☐ Messy
☐ Doesn't follow instructions or mind
☐ Swears, curses or uses obscene language
☐ Toileting
☐ Dawdles or is "pokey"
☐ Short attention span
☐ Biting
☐ Slow to solve problems

☐ Hyperactivity
☐ Awkward/Clumsy
☐ Daydreaming
☐ Demands too much attention
☐ Sensitive/Easily hurt or upset
☐ Shyness
☐ Masturbation
☐ Has lots of fears or has severe fears
☐ Competitive
☐ Temper tantrums or "fits"
☐ Withdraws or runs away from others
☐ Lies
☐ Hurts self
☐ Argues or talks back
☐ Never finishes activities or jobs
☐ Eats too much or eats too little
☐ Bedtime problems
☐ Won't share
☐ Engages in stereotypic rituals (e.g., hand flapping)
☐ Imitates others too much
☐ Other ______________________

______________________

______________________

51. On the lines below, circle the number between the two words that best describes your child. Be sure to circle one number.

Example: relaxed 1 2 3 4 5 [✓ 6] 7 tense N/A

My child is:

| | | | | | | | | | Not Applicable |
|---|---|---|---|---|---|---|---|---|---|
| dependent | 1 | 2 | 3 | 4 | 5 | 6 | 7 | independent | N/A |
| relaxed | 1 | 2 | 3 | 4 | 5 | 6 | 7 | tense | N/A |
| stubborn | 1 | 2 | 3 | 4 | 5 | 6 | 7 | cooperative | N/A |
| sad | 1 | 2 | 3 | 4 | 5 | 6 | 7 | happy | N/A |
| gentle | 1 | 2 | 3 | 4 | 5 | 6 | 7 | rough | N/A |
| takes over | 1 | 2 | 3 | 4 | 5 | 6 | 7 | gives in | N/A |
| curious | 1 | 2 | 3 | 4 | 5 | 6 | 7 | not curious | N/A |
| difficult to discipline | 1 | 2 | 3 | 4 | 5 | 6 | 7 | easy to discipline | N/A |
| cautious | 1 | 2 | 3 | 4 | 5 | 6 | 7 | adventurous | N/A |
| easygoing | 1 | 2 | 3 | 4 | 5 | 6 | 7 | demanding | N/A |
| hard to handle | 1 | 2 | 3 | 4 | 5 | 6 | 7 | easy to handle | N/A |
| patient | 1 | 2 | 3 | 4 | 5 | 6 | 7 | impatient | N/A |
| troublesome | 1 | 2 | 3 | 4 | 5 | 6 | 7 | helpful | N/A |
| calm | 1 | 2 | 3 | 4 | 5 | 6 | 7 | hyperactive | N/A |
| noisy | 1 | 2 | 3 | 4 | 5 | 6 | 7 | quiet | N/A |
| outgoing/friendly | 1 | 2 | 3 | 4 | 5 | 6 | 7 | shy | N/A |
| obedient | 1 | 2 | 3 | 4 | 5 | 6 | 7 | disobedient | N/A |
| careless | 1 | 2 | 3 | 4 | 5 | 6 | 7 | careful | N/A |
| kind | 1 | 2 | 3 | 4 | 5 | 6 | 7 | mean | N/A |
| polite | 1 | 2 | 3 | 4 | 5 | 6 | 7 | rude | N/A |
| insecure | 1 | 2 | 3 | 4 | 5 | 6 | 7 | confident | N/A |
| messy | 1 | 2 | 3 | 4 | 5 | 6 | 7 | neat | N/A |

(please note space for comments on following page)

COMMENTS: ____________________

52. What are your child's most attractive characteristics or behaviors?

53. What are your child's least attractive or most irritating characteristics or behaviors?

54. Has any especially good or difficult thing happened to your child? Please describe.

55. What methods of control do you usually use with your child? Also mark if it usually works for you and your child.

| USED OR HAVE TRIED | | WORKS | COMMENTS |
|---|---|---|---|
| ☐ | Redirection of interest | ☐ | |
| ☐ | Prevention of undesirable behavior before it occurs | ☐ | |
| ☐ | Ignoring | ☐ | |
| ☐ | Spanking | ☐ | |
| ☐ | Reasoning | ☐ | |
| ☐ | Threatening | ☐ | |
| ☐ | Comparing Child with another | ☐ | |
| ☐ | Depriving of some privilege or pleasure | ☐ | |
| ☐ | Sitting on a chair | ☐ | |

55. (continued)

| USED OR HAVE TRIED | WORKS | COMMENTS |
|---|---|---|
| ☐ Sending child to room | ☐ | ____________________ |
| ☐ Yelling or screaming | ☐ | ____________________ |
| ☐ Praising good behavior | ☐ | ____________________ |

Any other methods you use, have tried, or that worked.

| | WORKS | |
|---|---|---|
| ____________________ | ☐ | ____________________ |
| ____________________ | ☐ | ____________________ |

56. ☐ yes ☐ no Do the adults in the household usually agree on child rearing practices?

CHILD'S PLAY ACTIVITES

57. Where does your child usually play (e.g., in the backyard, kitchen, living room, etc.)

________________________________________

________________________________________

58. ☐ yes ☐ no Are there children of the same age in the neighborhood?

59. Who are your child's most frequent playmates?

| Name | Age | Sex |
|---|---|---|
| ______________ | ___ | ___ |
| ______________ | ___ | ___ |
| ______________ | ___ | ___ |

☐ Doesn't have any playmates.

60. Does your child usually play:

☐ alone
☐ with 1 or 2 children
☐ with more than 2 children
☐ Not Applicable

61. When playing, is your child usually:

☐ a leader
☐ a follower
☐ both
☐ N/A

62. Does your child usually prefer playing with children:

☐ of the same age
☐ older
☐ younger
☐ N/A

63. ☐ yes ☐ no Does your child have a special friend? (Please specify.)

______________________________

64. ☐ yes ☐ no ☐ N/A Does your child play well with brothers and/or sisters?

65. What are your child's favorite toys and activities? Please list.

______________________________

66. ☐ N/A What books are your child's favorites? Please list. __________

______________________________

67. REASONS FOR ATTENDING SCHOOL

Please specify. ______________________________

______________________________

______________________________

In what ways can we help your child this year? What skills or behaviors would you like us to work on? __________________

______________________________

______________________________

67. (continued)

Are there any of your child's behaviors that you would like us to watch this year? ______________________________

______________________________

What skills are you working on at home with your child? ______________

______________________________

68. CHILD'S ROUTINES

Eating:

What foods are particularly liked? ______________________________

What foods are refused? ______________________________

Problems associated with eating? ______________________________

______________________________

Sleeping:

Naps from ______________ to ______________________________

Problems associated with sleeping? ______________________________

______________________________

Toileting:

Is your child toilet trained? ______________________________

Words your child uses or understands for toileting: ______________

______________________________

BROTHERS & SISTERS

How many brothers or sisters does your child have? ☐

69. Brother's or Sister's Name:

______________________________

a. Living in Home: ☐ yes ☐ no

b. Sex: ☐ M ☐ F

c. Birth date: ☐ month - ☐ day - ☐ year

d. Does this child have any special problems? ☐ yes ☐ no

If answer is 'Yes', please describe. ______________________________

______________________________________________________________

______________________________________________________________

70. Brother's or Sister's Name: ______________________________

a. Living in Home: ☐ yes ☐ no

b. Sex: ☐ M ☐ F

c. Birth date: ☐ month - ☐ day - ☐ year

d. Does this child have any special problems? ☐ yes ☐ no

If answer is 'Yes', please describe. ______________________________

______________________________________________________________

(Note: If there are more than two siblings in the home, please ask for extra copies of this page.)

## PARENTS

### Mother

71. ☐ yes ☐ no Living in home

72. Mother's Birth date: ☐ month - ☐ day - ☐ year

73. Mother's Marital Status:

☐ Single ☐ Separated ☐ Widowed

☐ Married ☐ Divorced ☐ Remarried

74. Mother's Occupation ______________________________

75. Mother's Highest Education Completed:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Grade School | Jr. High | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | M.A. | Ph.D. |
| | | | High School | | | | College | | | | |

☐ Other (e.g., vocational school, nursing) ☐ Still in school (mark one other box also.)

Please specify. ______________________

76. Mother's medical problems.

☐ Vision (not correctable with glasses) ☐ Orthopedic

☐ Hearing ☐ Psychological

☐ Speech ☐ Other health impairments (e.g., severe headaces, ulcers) ____________

____________

77. Mother's General Health: ☐ Good ☐ Fair ☐ Poor

Father

78. ☐ yes ☐ no Living in Home

79. Father's Birth date: ☐ month - ☐ day - ☐ year

80. Father's Marital Status:

☐ Single ☐ Separated ☐ Widowed

☐ Married ☐ Divorced ☐ Remarried

81. Father's Occupation ______________________________

82. Father's Highest Education Completed:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Grade School | Jr. High | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | M.A. | Ph.D. |
| | | | High School | | | | College | | | | |

☐ Other (e.g., vocational school, nursing) ___ Still in school (mark one other box also.)

Please specify. ______________________

83. Father's medical problems:

☐ Vision (not correctable with glasses) ☐ Orthopedic

☐ Hearing ☐ Psychological

☐ Speech ☐ Other health impairments (e.g., severe headaches, ulcers) ______________

84. Father's General Health: ☐ Good ☐ Fair ☐ Poor

85. What language is used in your home most frequently?

☐ English
☐ Spanish
☐ French
☐ Other ______

86. What other languages are spoken in your home?

Please specify. ______

87. OTHER PERSONS IN HOUSEHOLD

How many other persons live in your household (e.g., grandmother, boyfriend, etc.?)

☐

a. Person's Name: ______

Relationship to Child: ______

b. Person's Name: ______

Relationship to Child: ______

c. Person's Name: ______

Relationship to Child: ______

88.

| Names of serivce programs your family has been or is in: | Approximate Dates: | How did you find our or who told you about the program: |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

89. Your family's income (before taxes):

☐ $0 - 4.999
☐ $5,000 - 9,999
☐ $10,000 - 14,999
☐ $15,000 - 19,999
☐ $20,000 - 24,999
☐ $25,000 - 29,999
☐ $30,000 - above

Description of Subjects from Child History Form.

1. Adoption: Of the 221 subjects, 212 indicated whether or not their child was adopted. Eleven, or 5.18%, were adopted. Seven of these (64%) were male and 4 (36%) were female. Since 58% of the sample were male, a slightly higher proportion of males were adopted.

2. Birth-weight: Birth-weight was given on 172 of the 221 subjects. The average size was 7 lbs. 6 ozs. The frequency distribution of birth weight is given in Table 27 for these subjects. For females, the average size was 7 lbs. 4 ozs., and for males 7 lbs. 9 ozs.

3. Problems at Delivery. In response to whether the birth of this child was normal, 112 out of 205 (54.63%) responded that it was, while 93 (45.36%) responded that the birth was not normal. Two-hundred-and-three parents also indicated whether or not there were problems at the birth. A total of 67 (33%) indicated that there were problems while 133 (65.51%) said there were no problems.

Of the 112 who indicated that the birth was normal, 21 said that there were problems during the birth. Of the 88 who stated that the birth was not normal, 42 indicated that there were no problems at the birth.

4. Pregnancy History: Table 28 presents the frequency distribution of pregnancy term as reported on the Child History form. Data have been rounded to the nearest month. Distributions are provided for male and female infants separately. The mean pregnancy term for male infants was 9.26 months and 9.17 months for females.

Respondents indicated that there were problems during pregnancy for about 25% to 30% of the children in the ECI data base. The frequency of problems reported for males and females was approximately equal (males, 26.2%; females, 28.7%).

The mean length of labor was reported as 8.7 hours with a standard deviation of 9.3 hours. (The mean length of labor for subjects in the Brazelton component of the DBMS was also 9.3 hours.)

5. Parent Perceptions and Attitudes: Respondents indicated that the pregnancy was planned in 57% of the pregnancies and that the mother felt supported by the father on 80% of the pregnancies, by the mother's parents 86%, and father's parents 79%. They also reported that there were major life changes in the home in 17% of the pregnancies. Table 29 presents the mean IQs for each of these categories for the sample that had both child history data and Stanford-Binet scores.

Although tests of significance have not been obtained on these data, it appears that pregnancies that are planned produce children with higher IQ scores, and, in general, the more support the mother feels, the more favorable the outcome. This comparison is being examined statistically. It is possible, however, that pregnancies

## Table 27

Distributions of Birth Weights for 172 Subjects Whose Primary Caregiver Recorded Information on the Child History Form.

| | N | % |
|---|---|---|
| 3 lbs or less | 3 | 1.74 |
| 3 lbs 1 oz to 4 lbs | 9 | 5.23 |
| 4 lbs 1 oz to 5 lbs | 9 | 5.23 |
| 5 lbs 1 oz to 6 lbs | 26 | 15.11 |
| 6 lbs 1 oz to 7 lbs | 64 | 37.32 |
| 7 lbs 1 oz to 8 lbs | 47 | 27.32 |
| 8 lbs 1 oz to 9 lbs | 10 | 5.81 |
| 9 lbs 1 oz to 10 lbs | 3 | 1.74 |
| 10 lbs 1 oz or more | 1 | .58 |

## Table 28

### Length of Pregnancy Rounded to Nearest Half Months for Males and Females According to Child History Forms

| Pregnancy Term (in months) | Males | | Females | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| 10.0-10.4 | 5 | 5.1 | 2 | 2.9 |
| 9.5-9.9 | 18 | 18.4 | 12 | 17.4 |
| 9.0-9.4 | 58 | 59.2 | 43 | 62.3 |
| 8.5-8.9 | 11 | 11.2 | 5 | 7.2 |
| 8.0-8.4 | 4 | 4.1 | 1 | 1.5 |
| 7.5-7.9 | 1 | 1.0 | 5 | 7.2 |
| 7.0-7.4 | 1 | 1.0 | 0 | 0 |
| 6.5-6.9 | 0 | 0 | 1 | 1.5 |
| N | 98 | | 69 | |
| No data Reported | 30 | | 24 | |

## Table 29

## Mean IQ Scores for Sample with Both Child History and Stanford-Binet scores for Respondents' Perceptions of Environment During Pregnancy

| | Mean IQ | | |
|---|---|---|---|
| | Yes | No | No Response |
| Pregnancy Planned | 108.4<br>N=41 | 96.19<br>N=26 | 105.3<br>N=55 |
| Father Supports Pregnancy | 103.2<br>N=57 | 98.3<br>N=10 | 97.2<br>N=55 |
| Mother's Parents Support Pregnancy | 104.0<br>N=61 | 97.0<br>N=4 | 87.00<br>N=57 |
| Father's Parents Support Pregnancy | 104.6<br>N=56 | 92.9<br>N=8 | 93.4<br>N=58 |
| Major Change in the Home | 98.6<br>N=12 | 102.0<br>N=57 | 108.31<br>N=53 |

with less favorable outcomes are remembered differently than others. A study comparing maternal attitude and stress during pregnancy with development and intelligence of the infant is being planned.

Parents were asked if they felt their child had any special problems, including language, retardation, and behavior problems. These data were available on 122 subjects for whom Stanford-Binet data were also available. Thirty-five (28.7%) felt their child had language problems; only 4 (3.3%) identified retardation as a problem; and 8 (6.6%) felt that their child had behavior problems. A total of 44 (36%) indicated that their child had some problem. A summary of the parents' perceptions of their children's problems, and the related IQ data is provided in Table 30. The mean and standard deviations for this group is quite high, probably because a much higher proportion fall beyond the second standard deviation ($IQ < 68$ or $IQ > 132$) than are found in the normal population (19% as compared to 6%) or in our entire sample. The children classified by parents as having problems tended to have lower IQs than those not so classified, even though the problems of those children are not directly related to intelligence. The item measuring retardation was answered affirmatively by only 4 respondents, indicating that many parents were unaware of their child's classification. All four fell below the second standard deviation on IQ.

## Mother Characteristics

Mothers of the 219 children for whom Child History forms exist are generally residing with the child at home. Only two respondents indicated that this was not true; however, 52 did not answer this item.

One-hundred-thirty-nine (64%) of the mothers were married; 10 (5%) were separated; 15 (7%) were divorced; 5 (2%) were remarried; and 49 (22%) gave no answer.

The women in this sample were generally well educated. Eight (4%) had less than a high school education; 43 (20%) had 12 years of education; 51 (23%) had from 13 to 16 years, or the rough equivalent of a college education; and 66 (30%) had more than 16 years of education.

## Father Characteristics

Fathers also resided primarily in the home, although not as frequently as mothers. Twenty-seven out of 219 were not in the home and 48 did not respond.

One-hundred-forty-one (64%) of the fathers were married; 6 (3%) were separated; 13 (6%) were divorced; 4 (2%) were remarried; and 54 (25%) did not respond. This pattern is very similar to that of the mothers.

### Table 30

### Parents' Perceptions of Children's Problems and Related IQ Data

| | | N | IQ Scores $\bar{x}$ | IQ Scores standard deviation |
|---|---|---|---|---|
| Language Problems | Yes | 35 | 89.43 | 23.89 |
| | No | 82 | 110.93 | 16.55 |
| | No Data | 5 | 122.00 | 29.99 |
| Behavior Problems | Yes | 8 | 85.62 | 24.88 |
| | No | 113 | 106.20 | 21.28 |
| | No Data | 1 | 94.00 | --- |
| All Subtests | | 114 | 104.75 | 21.95 |

Fathers' educational level was generally similar to the mothers': The median years of education was 16, or about at the college degree level. Six (3%) had less than a high school education; 32 (15%) had 12 years; 46 (21%) had from 13 to 16 years; and 81 (37%) had more than 16 years.

## Findings

1. The intelligence of a child appears to be related to the mother's perceptions of the support she received during pregnancy, the life changes during that time, and her report concerning whether the pregnancy was planned.

2. Children identified by parents as having problems have generally lower IQ scores than those not seen to have a problem. However, standard deviations were quite high.

3. The families filling out Child History forms tended to be well-educated (median years of school was 16 years for mother and father). There is no comparison sample for families that did not complete the form.

## Future Research

1. Analyze the effect of maternal attitude and stress on pregnancy outcome and infant development. Determine if scores on the Bayley and the NBAS-K are related to maternal perception of support.

2. Continue analysis of Child History data and do comparisons with other outcome measures.

## STUDY 8: WHAT ARE THE VISUAL SKILLS OF CHILDREN WITHIN THE DATA BASE AND HOW DO THESE SKILLS RELATE TO OTHER OBSERVATIONAL MEASURES?

(PI: Foster)

Purpose. In cooperation with Dr. Charles Spellman of Parsons State Hospital and Training Center (Kansas), visual acuity measures were obtained on 84 children who were participants as subjects in other ECI studies. These measures were obtained in partial fulfillment of a Bureau of Education for the Handicapped grant (Grant # G007 602592) but arrangements were made to include them in the ECI data base. Dr. Spellman and his colleagues developed the PVAT for severely handicapped individuals. Our discussions led us to believe that the procedures which they had developed for individuals of very low mental ages may also be useful for young children, especially for those who were unable to complete the more traditional Snellen E test of visual acuity.

Subjects. Eighty-four subjects had visual acuity data as well as data in at least one other project within the ECI data base. Of these, 45 were male and 39 were female. The median age at the first visual acuity test was 4 years, 7 months. The range in ages was from 1 year, 10 months to 8 years, 6 months. All subjects were enrolled within one of the preschool settings in either the Department of Human Development and Family Life, the Department of Special Education, or the Bureau of Child Research at the University of Kansas.

Settings. Testing was done in individual testing rooms or in isolated corners of larger classrooms. The equipment used was either the discrimination tasks of the Parsons Visual Acuity Test (PVAT; Cress, Spellman, DeBriere, Sizemore, Northam & Johnson, 1981) or the Snellen E. Chart. A complete description of the PVAT is given in the Cress et al., 1981 article and Figures 78, 79, and 80 from this article are presented here.

Procedures/Data Collection. Standardized data collection procedures as described for the PVAT and the Snellen E were used. Both nearpoint and farpoint vision measures were obtained for the right eye, the left eye, and both eyes. In all cases the PVAT was given first. The PVAT was typically repeated totally or in part from 1 to 3 times. In addition 44 subjects were also given the Snellen E test as a validity check on earlier tests if the subject could respond to the more complex requirements of the Snellen E chart.

Procedures for the administration of the PVAT are quoted from Cress et al., 1981 (p. 44): This test uses a 13-inch distance between the person and the test targets. Distance testing is accomplished by optically simulating a 20-foot distance with a plus-3 Diopter lens. The person being tested must be able to touch or place a match card on a picture of a hand when presented with a card showing a hand, cake, and bird. These test targets were developed by Allen (1957) for use with preschool children. The PVAT also includes alternate procedures for testing persons who can discriminate between the test targets but are unable to point or manipulate the match card.

A discrimination training program is included in the PVAT kit for persons who fail to perform on this test initially. These discrimination

433

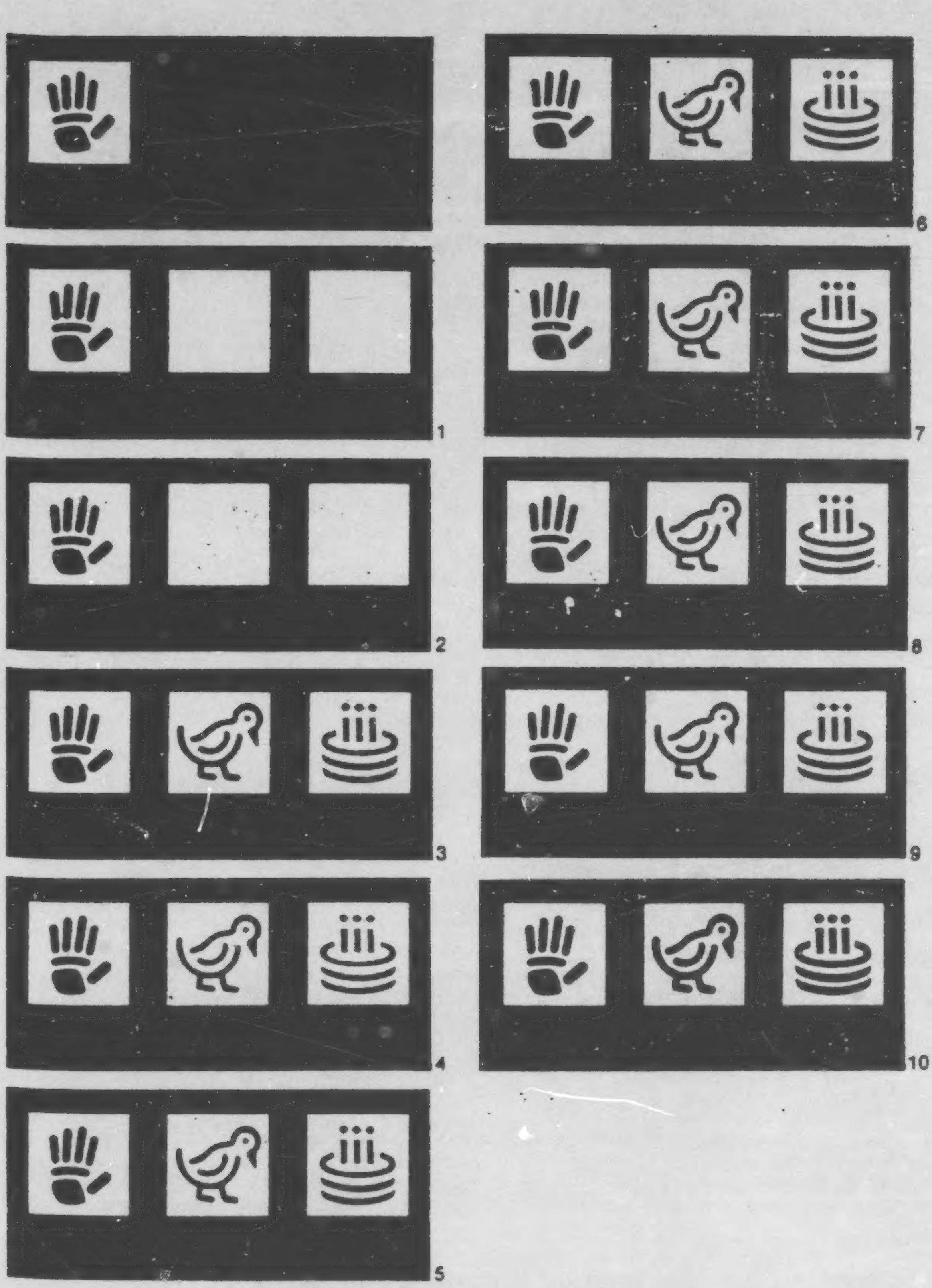

6
1
7
2
8
3
9
4
10
5

Figure 78. Selected trials from the Intensity Fading Program.

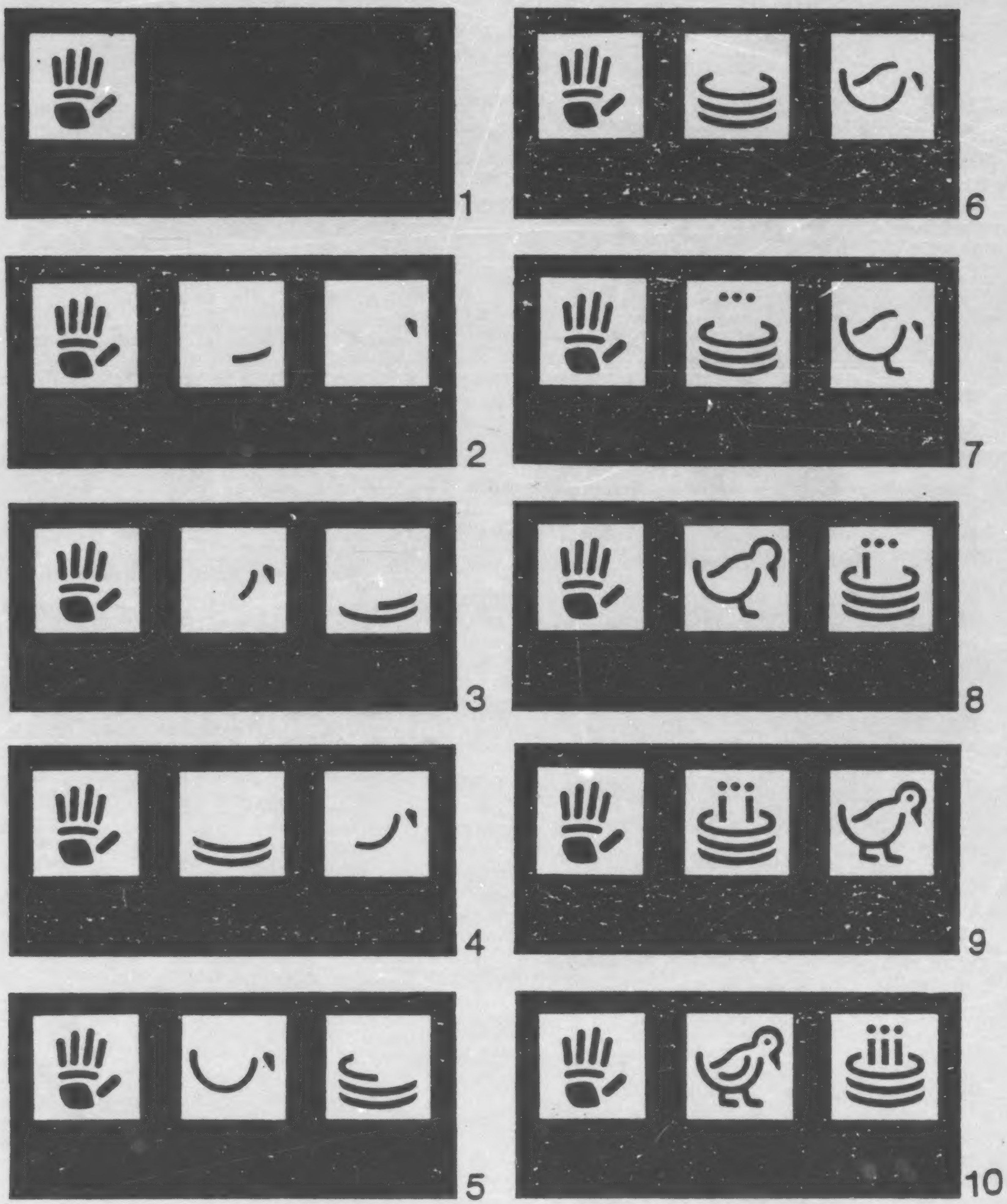

1
2
3
4
5
6
7
8
9
10

Figure 79. Selected trials from the Stimulus Shaping Program.

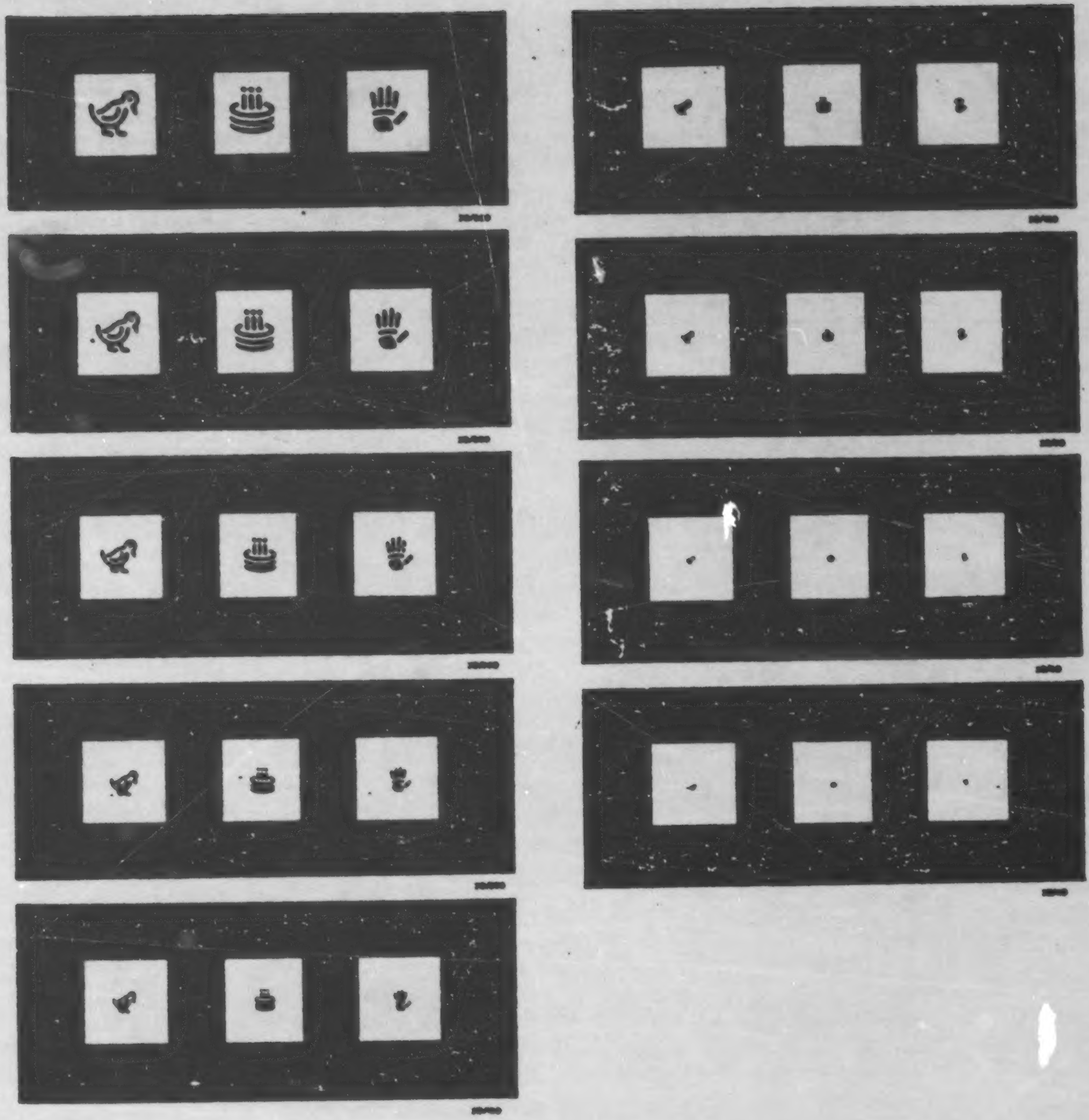


Figure 80. Selected trials from the Threshold Series.

2

training procedures were inspired by previous research by Terrace (1963), Sidman and Stoddard (1966), and Dorry and Zeaman (1975) in errorless learning.

Figure 77provides selected examples of the intensity fading discrimination training program. The program consists of 30 cards (three stimulus cards at each of 10 stages of intensity). The figure being trained is always at full intensity (black), and the other two figures gradually become darker, beginning with a very light gray and ending in black. Another discrimination training program using a stimulus shaping approach is now being developed and is illustrated in Figure 78. This discrimination training program uses the same three pictures but gradually introduces segments of the cake and bird. Preliminary data indicate that for some persons this approach is more successful than the intensity fading program.

Persons who can discriminate reliably between those figures are presented a series of cards that systematically reduce the size of the test targets. Figure 79 provides a sample of selected stimuli used in the threshold series. Results from field testing show that 90% of those persons who were previously untestable were able to perform on the PVAT (Cress, 1980).

The Snellen E was administered by having the child stand 20 feet in front of the chart, cover one eye, the test adminstrator points to an "E", and the child indicates which way it is pointing. When the child has missed direction on 2 or more on a row, the visual acuity is determined. The other eye, and then both eyes are tested in the same way. The Snellen E chart requires the child to match a subtle response with a stimulus from a distance of 20 feet. This response has been too complex for some young children or those with developmental delay.

Results. Of the 84 children who were tested for visual acuity, four (5%) of them already had glasses, 19 (23%) had scores indicating that referral for further testing was in order (i,e,, visual acuity of 20/40 or worse on two occasions). Of the 19 referrals that were made, follow-up results were obtained from the families' ophthalmologist or the optometrist in 8 cases. Four of these children has some visual problem although they did not necessarily require glasses, and four children received no recommendations for visual interventions. Local ophthalmologists felt that a score of 20/70 indicated necessity for correction.

Forty-two children were given both the Snellen E and the PVAT tests. For 17 of these children (or 40%) the two tests were in agreement . For 22 (53%) the Snellen test gave a result indicating better vision than the PVAT. For 3 children (7%), the PVAT gave the better results.

Twenty-two subjects had both Visual Acuity tests and the Stanford-Binet. An analysis of these sets of scores was made to determine if the subjects who could be tested in the PVAT differed from those that could be tested on both the PVAT and the Snellen E. Table 31 provides the results from this analysis.

## Table 31

### Stanford-Binet Scores for Subjects with Visual Acuity Results

| | Subjects with only PVAT & IQ N = 15 | Subjects with IQ & both Snellen & PVAT N = 7 | Subjects with IQ & one or more Visual Acuity Tests N = 22 |
|---|---|---|---|
| Mean Mental Age (in months) | 59.7[1] | 64.3[1] | 61.1 |
| Standard Deviation | 11.44 | 13.06 | 11.86 |
| Mean IQ | 87.3[2] | 106.0[2] | 93.3 |
| Standard Deviation | 28.98 | 14.33 | 26.41 |

[1] Difference between mean mental age of subjects with both Snellen E and Parsons Visual Acuity Test (PVAT) and those tested on the PVAT only was significant beyond the .02 level (t= 2.74, df=20, 2-tail test).

[2] Difference between mean IQ of subjects with both Snellen and PVAT and those tested on the PVAT only was significant beyond the .0010 level (t= 5.70, df= 20, 2-tail test).

Subjects with Visual Acuity testing had a mean Mental Age of 61.1 months, and a mean IQ of 93.3. Of these 22 subjects, 7 had results on both the Snellen E and the PVAT. Their mean IQ was 106.0 and mean Mental Age was 64.3. In contrast the 15 subjects with only PVAT tests of visual acuity had significantly lower Mental Ages ($+ = 2.74$, $p < .02$) and IQs ($+ = 5.70$, $+ < .001$) than subjects with both Snellen and PVAT.

Discussion. Approximately 10% of the children in this study had visual problems warranting glasses or other intervention. Five percent were identified as a result of this study.

Comparison of the results of the Snellen E and the PVAT indicates that the PVAT was more likely to result in lower Visual Acuity scores and consequently a higher rate of referral. However, the PVAT could be given successfully to children of lower mental ages (i.e., younger normal intelligence children) than the Snellen. The implications of this is that one can screen earlier for visual problems but that more children may be referred than would be found later.

Analysis of these results indicated that further research was required for determining 1) appropriate criteria for referral for the PVAT and 2) the visual performance of children with low PVAT scores. These data were used as the basis for a successful grant application to BEH (G007901961) by Spellman and Cress to adapt the PVAT to the early childhood population. The grant is just now being completed and a third grant designed to train individuals in the administration of the PVAT has been obtained. An interesting result of these later grants is that young children scoring less than 20/40 are very likely to require glasses, and that the ophthalmologist's criteria of 20/70 may need to be adjusted.

Findings.

1. 10% of children in sample had some visual problems.
2. Of the 8 children referred on the basis of visual acuity tests, 50% did require some intervention. Part of the overreferral was due to local visual professionals suggesting a higher criterion than the one suggested by Dr. Spellman and colleagues.
3. The PVAT typically resulted in more referrals than the Snellen E when both tests were successfully administered, but the PVAT could be given to children who were younger and of lower mental age.
4. These results were used for obtaining further funding by Dr. Spellman and colleagues to produce a test with appropriate criteria for preschool children. Testing the PVAT with a large number of children indicated that the lower cutoff visual acuity less than 20/40 is appropriate.

Recommendations for further research. Future research should investigate the question of how children who score lower on PVAT than Snellen differ in visual performance, intelligence and behaviors as compared to children who obtain similar results.

# CHAPTER V DISSEMINATION ACTIVITIES

## Introduction

All too often, the main beneficiaries of federally sponsored research are the principal investigator and sponsoring institution. The knowledge or products evolving from federally sponsored research frequently fail to impact practice, or do so after a considerable lag in time, partly because researchers may not see dissemination as a significant problem. The lag between the initial conception of scientific knowledge and its utilization has been estimated to average 19 years (Human Interaction Research Institute, 1976). With regard to educational practice, numerous investigators have noted similar limited or lagging utilization of research knowledge. Lippitt (1965) reported that a great proportion of significant new inventions in education remain quite invisible, undocumented, and inaccessible for consideration by potential adopters. Barton and Wilder (1964) observed in a study of reading texts for elementary-aged children that few of the findings from a generation of very active research on learning and reading had been included in those reading texts. Further, in an experimental study by Fox and Lippitt (1967), it was found that few innovations were adopted or even known by other teachers in a school or school system, despite the fact that some of their teaching colleagues had received intensive training in those innovations. The limited or lagging utilization of scientific knowledge has been studied by many of governmental agencies funding research: the National Institute of Education, the National Institute of Mental Health, the Environmental Protection Agency, and the Bureau for the Education of the Handicapped.

Dissemination is an integral component of the research and development mission of the Institute. The programmatic research efforts of the Institute have been aimed primarily at changing conditions that influence the development and general performance of young handicapped children. Widespread employment of interventions emerging from the Institute was dependent on several target groups not only becoming aware of Institute products but also developing proficiency in their use. Consequently, the dissemination obligation of the Institute has differed substantially from research units in which products are primarily informational. The Institute has approached the task of dissemination with the principle that one cannot depend solely on existing dissemination systems (i.e., journals and conferences). Such systems are important and will be utilized, but time factors and jurying procedures limit their effectiveness in disseminating the varied array of products of the Institute; accordingly a multi-faceted dissemination plan has been carried out.

## Products

A primary responsibility of the Institute staff was to work with investigators during the research planning stages to assure that appropriate consideration be given to the dissemination process. This process involved examining the research plan to determine the potential products that should be derived from the study, to determine the relationship of such products to other disseminated products being developed in the Institute, and to identify target populations. Product formats were selected, based on the needs of target groups and the design demands of what was being disseminated.

Following is a list of product formats used:

1. journal articles
2. conference presentations
3. intervention products
4. training products
5. position papers
6. models and constructs
7. workshops
8. seminars
9. structured conferences
10. consultations
11. on-site observations
12. collaborative efforts with other members
13. college courses
14. abstracts
15. nontechnical articles
16. bibliographies
17. books or chapters in books
18. slide shows
19. audio cassettes
20. video cassettes
21. press releases
22. general information brochure
23. practical paper series
24. working paper series
25. observation codes
26. four-Institute panel display

Dissemination activities were carried out with the intent to reach the scientific community, practitioners (including parents), and the general public.

## Dissemination to the Scientific Community

The scientific community interested in education of the handicapped is diverse, and there is no single dissemination outlet that promises universal coverage. Thus, the Institute made use of multiple methods of information transmission to fellow researchers and users of research information.

1. Retrieval Systems: A number of reports, experimental data, position papers, observation codes, conference presentations, etc., have been filed with ERIC.

2. Scientific Journals: The reports of Institute research have been published in and will be submitted to a number of different

journals. There are several resons for this strategy: (a) scholars often read journals quite selectively and idiosyncratically (Garvey & Griffith, 1971), which suggests that only a fraction of the total possible readership would see and read Institute research if it were published in one or two journals, and (b) scientists often use the bibliographies in published articles in conducting literature reviews; this process would be facilitated by the informal cross-referencing of Institute research, since scientists working together often cite one another (Garvey & Griffith, 1971). In general, publication in journals is to be preferred over publications in books or monographs, because books and monographs on research findings typically attract a more restricted academic audience (Human Interaction Research Institute, 1976). This injunction does not apply, obviously, to popularized accounts or textbooks.

3. Conferences: Institute research has been presented at a variety of conferences, since face-to-face encounters have been shown to be the most potent diffusion tool for many fields including psychology and education (e.g., Crane, 1970; Glaser, 1973; Garvey & Griffith, 1971; Parker & Paisley, 1966; Roberts & Larsen, 1971).

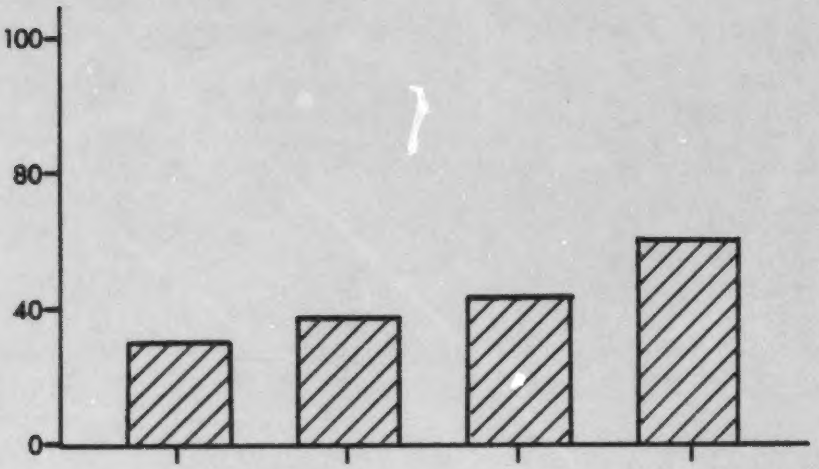
   Following the Cross-Institute Dissemination Conference in Los Angeles in 1980, Barbara Gentry, who was then the Kansas ECI Coordinator of Development, designed a four-panel poster display. Each panel illustrates a scene from one of the four BEH-funded Institutes and describes the purpose and focus of the Institute; an address for obtaining further information is also given. This poster was displayed, along with Institute brochures, abstracts, publications lists, and other materials, at 5 regional and national conferences.

4. Institute Document Service: This dissemination activity has included two types of documents of primary interest to other researchers:

   A. Working Papers Series: Research findings, literature reviews, theoretical discussions, and so forth, are often written up for oral presentation to other researchers and scientists but may not have been polished for publication in professional journals; such papers, however, contain valuable information and ideas, and can be distributed to the scientific community with positive benefits. The Kansas ECI Working Paper Series has enjoyed wide diffusion: 70 working papers have been made available for distribution; 887 requests for the papers have been filled. (See Figure 81).

   B. Observation Codes: Investigators at the Institute have developed codes for use in their research. These detailed

ECI WORKING PAPERS



DISSEMINATION OF WORKING PAPERS

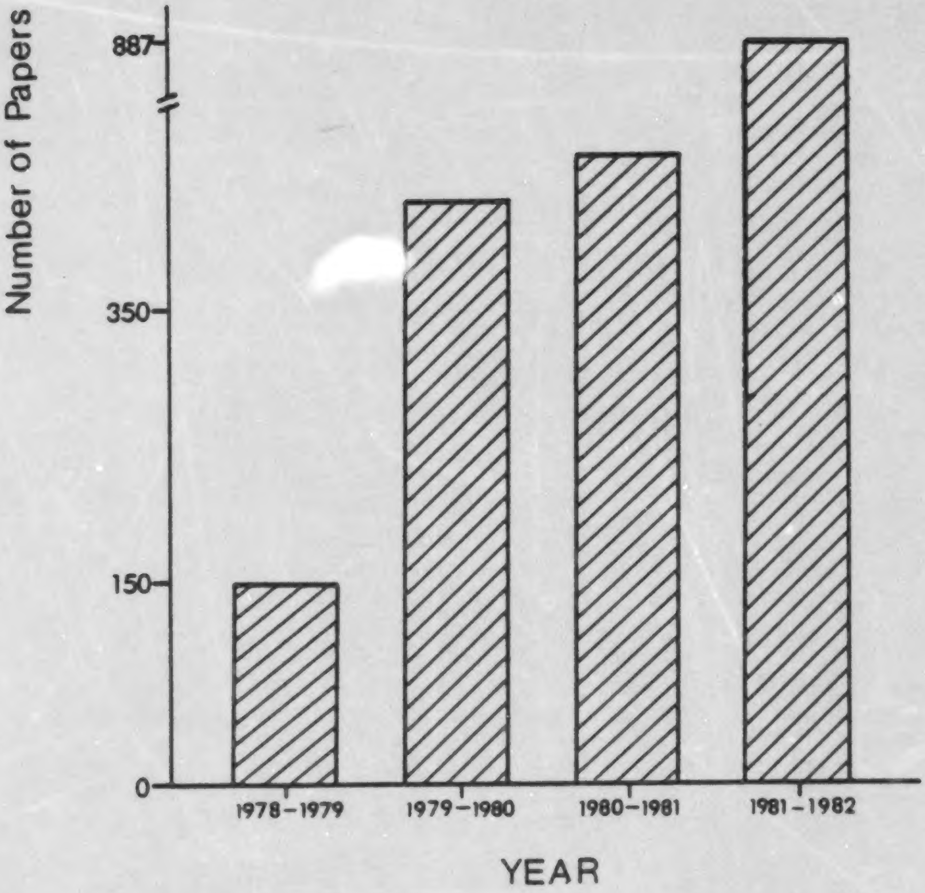


FIGURE 81

codes represent a time-consuming process that may be of value to other researchers involved in similar research. Eight are available as Early Childhood Institute Documents and have been disseminated, (along with practical papers and other non-techical papers) as shown in Figure 82.

## Dissemination to Practitioners

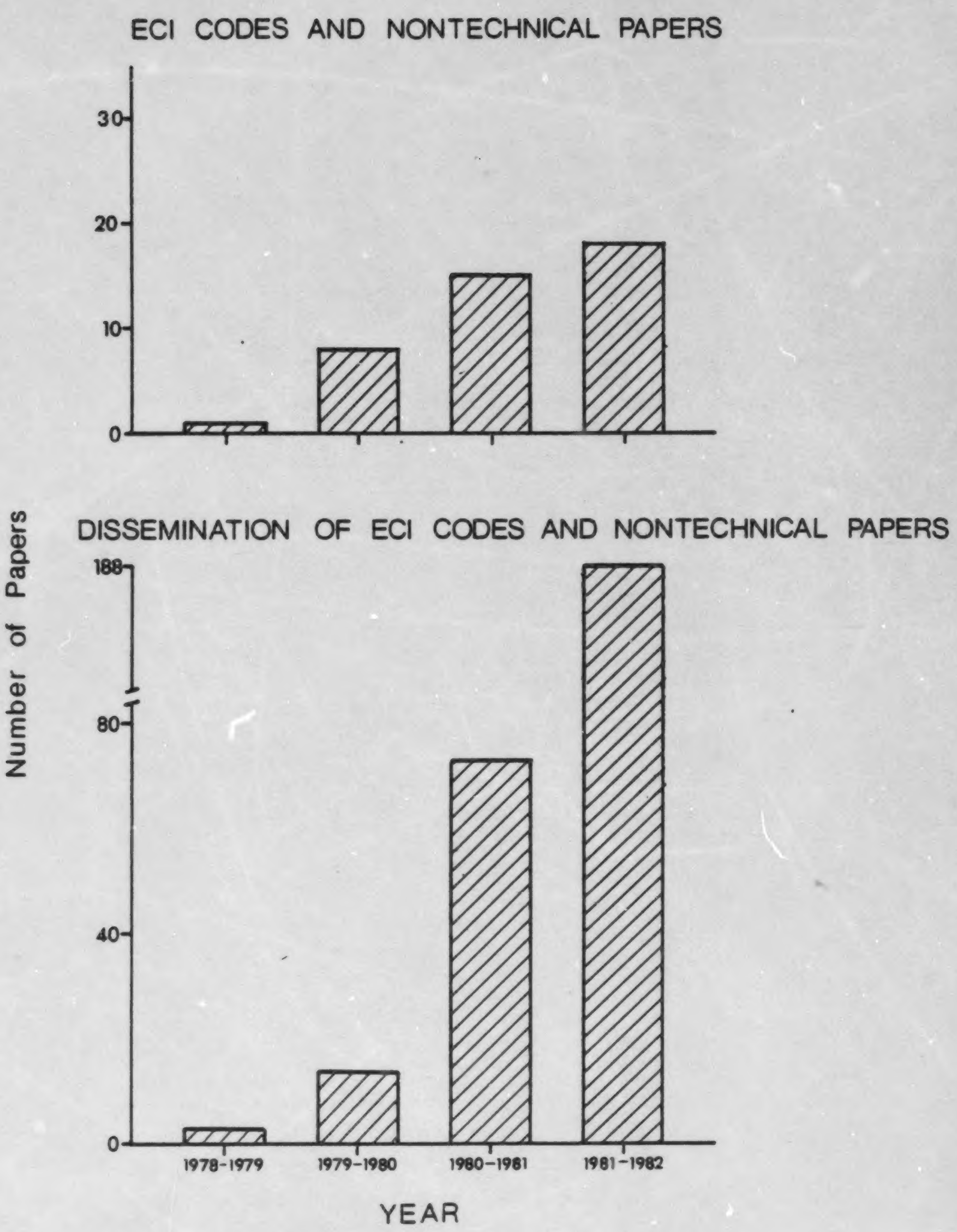
It is hoped that the knowledge and products generated by the Kansas Institute will be utilized by those who will be educating and treating young handicapped children. However, the literature on the utilization and diffusion of scientific knowledge shows quite clearly that adoption by field-based personnel is not automatic (e.g., Havelock, 1973; Human Interaction Research Institute, 1976), which also suggests that dissemination activities require careful planning. The strategy of researching and hoping for utilization has failings similar to the strategy of training and hoping for generalization (Stokes & Baer, 1977). Fortunately, several possibilities for a technology of dissemination emerge from the literature on the utilization and diffusion of scientific knowledge, which will be subsequently discussed. Within the context of that possible technology, one overriding principle stands out: Practitioners are most swayed by personal encounters (e.g., Clark, 1962; Glaser, 1973; Glaser, Coffey, Marks, & Sarason, 1967; Halpert, 1966; Havelock & Mann, 1968; Paisley, 1968; Rubin, 1968; Glaser & Wrenn, 1966; Lippitt & Fox, 1967). With the foregoing principle in mind, the following dissemination program for field-based practitioners has been carried out:

1. Practical Paper Series: Specific teaching and behavior management techniques for use by preschool teachers and parents of the handicapped have been made available in the form of the Practical Paper Series.

2. Applied articles: Articles about Institute research, written in lay language, were published in several periodicals read by practitioners. Each article focuses on only one explicit decision that a practitioner must make. Since such articles have more effect if the message is altered slightly and published in several forms (e.g., Garvey & Griffith, 1971; Halpert, 1966) such a strategy was used.

3. Consultations and Workshops: Many of the investigators and trainees have offered consultations and workshops in their area of expertise. We offered these services when Institute personnel traveled to the programs requesting assistance and were able to give immediate feedback and advice, utilizing the most current research results. Thus the practitioners had opportunities to discuss applications to their own settings in a concrete manner.

4. Inservice Programs: The Kansas Institute has many students and faculty members who possess current information about techniques and research being done for young handicapped children. Through an Inservice Program, a number of Institute personnel spoke to teachers on topics of interest and concern.


ECI CODES AND NONTECHNICAL PAPERS

DISSEMINATION OF ECI CODES AND NONTECHNICAL PAPERS

FIGURE 82

5. Site Visits: A few practitioners contacted the Institute to make site visits. When such requests occurred, core staff or investigators encouraged the practitioners to bring a colleague. The literature on diffusion suggests that two site visitors from the same agency will be more likely to get their agency to implement an innovation.

## Dissemination to the General Public

The public is often neglected as a direct consumer of research knowledge, although such knowledge may be quite valuable to individuals in the public. The value of that knowledge can be easily demonstrated in the case of young handicapped children. Much of the effectiveness of early identification and remediation programs depend on public awareness of the mere existence of such programs. Recognizing the importance of such public awareness, the Institute and the Office of University Relations for the University of Kansas worked together to develop a series of public announcements about Institute activities. Announcements were aired frequently during the fall and winter of 1981-1982. The announcements helped to create general awareness of the Institute.

Other efforts to reach the public-in-general, and parents-in-particular, have involved the weekly (Saturday morning) call-in radio show presented by Lynne and Dennis Embry of the Institute staff. The Embrys have caught the public ear through their half-hour show, "Living with Children," by discussing topics such as "Whining," Shopping with Children," and "Traveling with Children."

Brief TV appearances and radio talk-show appearances by other staff have provided opportunities for Institute staff to be in touch with concerns of "the public" and for that audience to learn about Institute staff and activities. Several newspaper articles about Institute personnel and their research programs have appeared in the Lawrence Journal World.

## Summary

The efforts of the Kansas Early Childhood Institute to disseminate its findings have included a wide variety of formats and a large number of audiences (see Tables 32, 33, 34, and 35). The total dissemination of Institute products can only be estimated by indicating the number of presentations reported and by showing the number of requests for documents recorded (see Figure 83). The unreported and unrecorded dissemination may have been considerable but cannot be shown. The sections on Training and Impact of the Institute which follow provide additional information about the extent of Institute dissemination activities.

## DISSEMINATION EFFORTS
## 1978–1982

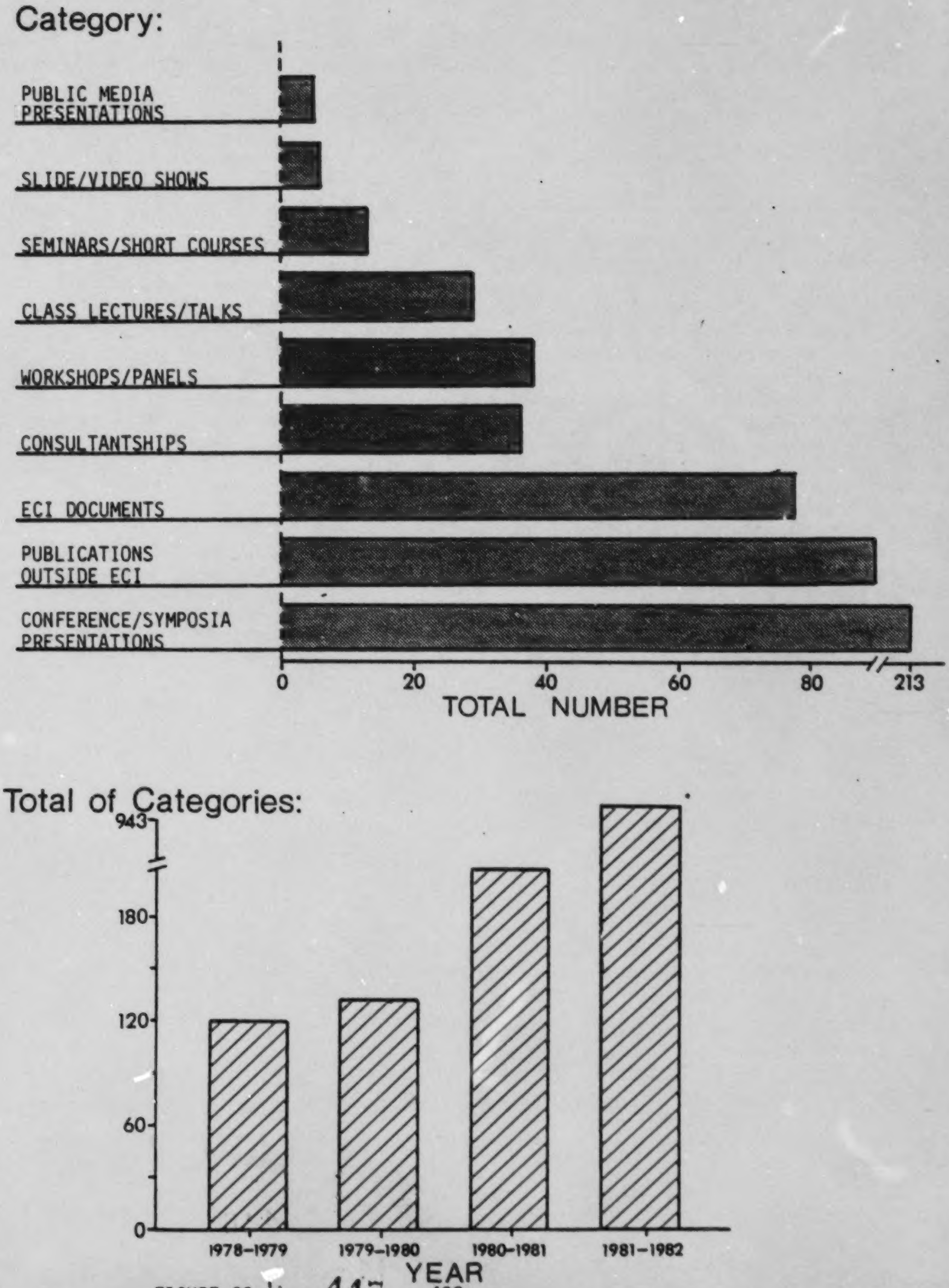


FIGURE 83

## TABLE 32A

## DISSEMINATION DURING YEAR 5

Allen, K.E. Behavior management in the classroom (video tape). Baltimore: University Park Press, 1982.

Allen, K.E. *Early intervention and the handicapped child: A policy perspective*. Paper presented at the Southeast Society for Research in Child Development, April, 1982.

Allen, K.E. *The team approach to early intervention*. Paper presented at the 59th Annual Council for Educational Children International Conference, New York, April, 1981.

Allen, K.E., & Goetz, E.M. (Eds.) *Early childhood education: Special problems, special solutions*. Germantown, MD: Aspen Systems Publishers, in press.

Allen, K.E., & Hart, B. *The early years--Arrangements for learning*. Englewood Cliffs: Prentice-Hall, in press.

Allen, K.E., & Hickey, D. *Teacher-collected data: Are they valid? Are they functional?* Association for Behavior Analysis, Milwaukee, May, 1981.

Alpert, C.L. Procedures for selecting a nonspeech communication mode and facilitating its use through incidental teaching. Paper presented at *The International Symposium on Autism: A Transdisciplinary View of Current Research and Methods*. Woodbury, N.Y., February, 1982. (ECI Document No. 462)

Alpert, C., Anderson, J.R., & Rogers-Warren, A. The training of parents of young language-delayed children. *Kansas Governor's Conference on Education for Parenthood*. Wichita, KS, March, 1982.

Alpert, C.L., & Rogers-Warren, A.K. *Teaching functional language to the handicapped: Using the natural environment as the context for training*. Paper presented at the annual meeting of the Association for Behavior Analysis, Milwaukee, May, 1982.

Baer, D.M. *How to plan for generalization*. Lawrence, KS: H & H Enterprises, 1981. (a)

Baer, D.M. *Technologies for mainstreaming*. Symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981. (b)

Baer,-M., Fowler, S.A., & Carden-Smith, L. *Using reinforcement to facilitate the transfer of academic skills from a remedial class to a normal class*. Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Baxter, D., Ruggles, T.R., Kramer, S.A., Aangeenbrug, M.H., Etzel, B.C., & LeBlanc, J.M. Manipulation of task size, teacher instructions and methods of materials presentation to reduce inappropriate behavior of a child in group teaching settings. Presented as a part of an invited symposium entitled *Instructional control, learning assessment and observational learning in groups of normal and atypical children*, Association for Behavior Analysis, Milwaukee, May, 1981.

Bennedicto, C., Fowler, S.A., & Baer, D.M. *Teaching preschoolers accurate self-reinforcement to improve their academic performance: "I'm right. I get a token."* Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Bickel, W.K., Stella, M.E., & Etzel, B.C. *Comparison of normal and atypical children during and after complex auditory discriminations.* Presented at the biennial meeting of the Society for Research in Child Development, Boston, April, 1981.

Bickel, W.K., Stella, M.E., & Etzel, B.C. Hypothesis and stimulus control: The assessment and control of children's inferences. In B.C. Etzel (Chair), *Educational assessment and intervention for difficult-to-teach children*. Symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Buchman, B., Embry, L.H., & Baer, D.M. Impact of parent training: A multiple in-home settings approach to the assessment of generalization. Paper presented at the 8th Annual Association for Behavior Analysis, Milwaukee, May, 1982.

Byrne, J., & Miller, C. *Neonatal responsivity to auditory stimuli: Strategies for early assessment*. Paper presented at the 22nd annual meeting of the Missouri Speech, Language and Hearing Association, Kansas City, Missouri, March, 1981.

Byrne, J., & Miller, C. *Neonatal responsivity to speech*. Paper presented at the annual meeting of the Canadian Psychology Association, Toronto, June, 1981.

Byrne, J.M., & Horowitz, F.D. Rocking as a soothing intervention: The influence of direction and type of movement. *Infant Behavior and Development*, 1981, *4*, 207-218.

Byrne, J.M., Miller, C.L., & Horowitz, F.D. *The newborn's psychophysiological and behavioral response to auditory stimuli*. Paper presented at the 89th annual meeting of the American Psychological Association, Los Angeles, August, 1981.

Carden-Smith, L., & Fowler, S.A. *Positive peer pressure: Team captains to promote appropriate transition behaviors*. Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Carden-Smith, L., Fowler, S.A., & Solnick, J.V. *The classroom observation system: A method for assessing the classroom behavior of preschool and kindergarten children*. Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Carden-Smith, L.K., & Fowler, S.A. An observation system for assessing and differentiating student and teacher behaviors in mainstreamed classrooms. *Analysis and Intervention in Developmental Disabilities*, in press.

Carden-Smith, L.K., & Fowler, S.A. An assessment of student and teacher behavior in treatment and mainstreamed classes for preschool and kindergarten. *Analysis and Intervention in Developmental Disabilities*, in press. (ECI Document No. 353)

Cooper, A.Y. Creative and conceptual learning activities for large group time. Workshop presented for PEECH Outreach, Educational Service Center IX, Wichita Falls, TX, June, 1982.

Cooper, A.Y. *How can a teacher help shy and aggressive preschoolers get along in a group?* Paper presented at the annual Midwest Association for the Education of Young Children, Indianapolis, May, 1982.

Cooper, A.Y. *Promoting social interaction in the classroom*. Paper presented at the annual meeting of the Midwest Association for the Education of Young Children, Rochester, MN, April, 1981.

Cooper, A.Y. *Teaching techniques which help make a mainstreamed preschool classroom work*. Paper presented at the annual meeting of the Kansas Council for Children and Youth, Leavenworth, KS, June, 1981.

Cooper, A.Y., & Heacock, B.S. *Language activities for preschoolers: Their importance and use across the day and over the years*. Paper presented at the annual conference of the Kansas Association for the Education of Young Children, Emporia, KS, October, 1981.

Cooper, A.Y., & Holt, W.J. Development of social skills and the management of common problems. In K.E. Allen & E.M. Goetz (Eds.), *Early childhood education: Special problems, special solutions*. Germantown, Md.: Aspen Systems Publishers, in press.

Curl, R.M., Kirby, K., & Fowler, S.A. *Tutor-mediated transition from a special preschool program to the public schools*. Presented at the Association for Behavior Analysis, Milwaukee, May, 1982.

Curl, R., Rowbury, T.G., & Baer, D.M. *The facilitation of social interaction with a picture-cue training program*. Presented at the eighth annual convention of the Association for Behavior Analysis, Milwaukee, May, 1982.

Embry, D. and Malfetti, J.L. Safe Play Kit. This kit will be produced and distributed by AAA to an estimated 40,000 preschool and day care centers later this year.

Embry, L.H. *Parent training or family therapy? Nobody said it would be this complicated*. Invited address at the 8th Annual Association for Behavior Analysis, Milwaukee, May, 1982.

Embry, L.H. Treatment of child abuse in the community. Workshop presented at the Menninger Foundation, Topeka, Kansas, June, 1982.

Embry, L.H. The Parent Program: Implementing proven home-based parent education. Workshop presented at the 9th Annual National Head Start Association's Conference, Detroit, Michigan, April, 1982.

Embry, L.H. What to do? Evaluating the effectiveness of parent and family involvement. Workshop presented at the 8th Annual Western Regional Conference, Teaching and Treating Children, Adolescents, and Parents. Las Vegas, NV, March, 1982.

Embry, L.H. The taxonomic key: An ecobehavioral approach to family interventions. In R. Dangel and R. Polster (Eds.), *Current research and issues in behavioral family therapy*. New York: Guilford Press, in press.

Embry, L. *What to do? Matching client characteristics to intervention techniques*. Paper presented at the National Conference on Parent Training, Dallas, September, 1981.

Embry, L.H. *A comparison of normal and abusive families' interactions in parent training*. Paper presented at the meeting of the Association for the Advancement of Behavior Therapy, Toronto, November, 1981.

Embry, L.H. Presentation of a paper on the state of the art in parent-family involvement at the HCEEP-DEC conference in Washington, D.C., December, 1981.

Embry, L.H., & Baer, D.M. *Group parent training: Assessment of generalization from classroom to home*. Paper presented at the 8th Annual Association for Behavior Analysis meetings, Milwaukee, May, 1982.

Embry, L.H., & Embry, D. are hosts for a local weekly radio show called "Living with Children." The half hour show's format includes discussion of specific child-rearing issues and audience participation through call-in arrangements. The show is on Saturday mornings. Some of the topics have been: Whining; (Trying New Foods); Sugar High, Sugar Low: Controlling Children's Sugar Intake; What to do? Bad Report Cards; Joint Custody in Divorce.

Embry, L.H. and Parent Program staff made presentations to several local parent groups including the Lawrence Association for the Protection of Safe Alternatives in Childbirth (LAPSAC), the Early Intervention Project's parent group, and to several human development and special education university classes.

Embry, L.H., & Sparling, J. *Evaluating the effectiveness of parent and family involvement*. A workshop presented at the HCEEP-DEC conference in Washington, D.C., December, 1981.

Embry, L.H. When and where does it hurt--a survey of parenting problems. ECI Document No. 304, 1981.

Etzel, B.C. Japan talks: *New Training Methods for Handicapped Children*: *Programming Materials to Reduce Errors*; *Functional Assessment of Handicapped Children*: *Assessment Procedures Resulting in Intervention*; *The Technology of Stimulus Control*: *Arranging Visual Stimuli*; *Attention*: *Visual Orientation Patterns*; *The Assessment of Problem-Solving Skills of Atypical Children*: *An Analysis of Stimuli and Responses*.

Etzel, B.C., Bickel, W.K., Stella, M.E., & LeBlanc, J.M. The assessment of problem-solving skills of atypical children. *Analysis and Intervention in Developmental Disabilities*, in press.

Fallows-MacDonald, R.P., Cooper, A.Y., Ruggles, T.R., & LeBlanc, J.M. *Manipulation of peer behavior and teacher attention as an antecedent stimulus to increase the social interaction of an isolate child*. Poster presentation at the meeting of the Association for Behavior Analysis, Dearborn, MI, May, 1980.

Fallows-MacDonald, R.P., Ruggles, T.R., & LeBlanc, J.M. Teaching strategy effects on children's acquisition of concepts through direct training and observational learning. In *Instructional control*, *learning assessment, and observational learning in groups of normal and atypical children*. Invited symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Foster, C.A. *Use of accountability systems for predicting future performance on a curriculum development project*. Poster session presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Foster, C.A., & Lent, J.R. *Use of accountability systems for predicting future performance on a curriculum development system*. Manuscript being prepared for publication, 1981.

Foster, C.A., Sandman, C.A., Ripley, L.M., & Swanson, J.M. *Ethological approaches to the assessment of self-reliance*. Paper presented at the 89th convention of the American Psychological Association, Los Angeles, August, 1981.

Fowler, S.A. Transition from special classes to regular classes: A question of generalization? Presented at the Association for Behavior Analysis, Milwaukee, May, 1982.

Fowler, S.A. Transition from preschool to kindergarten for children with special needs. One day workshop presented for the Rochester Area Special Education Cooperative, Rochester, MN, April, 1982.

Fowler, S.A. Transition from preschool to kindergarten for children with special needs. One day workshop presented for the Cloquet Area Special Education Cooperative, Cloquet, MN, February, 1982.

Fowler, S.A. Transition from preschool to kindergarten for children with special needs. ECI Document No. 381, 1982.

Fowler, S.A. *Recruiting peers to facilitate the integration of mildly handicapped children in the classroom and on the playground*. Paper presented at the Handicapped Children's Early Education Program (HCEEP) Director's Conference, Washington, D.C., December, 1981.

Fowler, S.A., & Baer, D.M. "Do I have to be good all day?" The timing of reinforcement as a factor in generalization. ECI Document No. 352, 1981.

Fowler, S.A., & Carden-Smith, L. *Preparing handicapped children for transition from special preschool to regular public school placements*. Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Fowler, S.A., & Mullins, B.S. Peer-mediated interventions in the classroom and on the playground. Colloquium sponsored by the Psychology Department at the University of Nebraska Medical Center, Omaha, NE, March, 1982.

Fowler, S.A., Mullins, B.S., & Paine, S. *Training peers to intervene with mildly handicapped classmates*: *Analysis of side effects*. Invited presentation at the Association for Behavior Analysis, Milwaukee, May, 1982.

Goetz, E.M., & Allen, K.E. (Eds.) *Early childhood education*: *Special environmental and legal considerations*. Rockville, MD: Aspen Publishing Co., in press.

Guess, D., Warren, S., Janssen, C., Noonan, M.J., Esquith, D., & Mulligan, M. Quantitative assessment of motor and sensory/motor acquisition in handicapped and nonhandicapped infants and young children--Volume III: Replication of the procedures. ECI Document No. 258, 1982.

Guess, D., Warren, S., Janssen, C., Noonan, M.J., Esquith, D., & Mulligan, M. Quantitative assessment of motor and sensory/motor acquisition in handicapped and nonhandicapped infants and young children--Volume IV: Application of the procedures. ECI Document No. 259, 1982.

Higgins, A.F., Stella, M.E., Aangeenbrug, M.H., LeBlanc, J.M., & Etzel, B.C. Analysis of variables controlling intelligible and unintelligible language of a preschool child. In *Educational assessment and intervention for difficult-to-teach children*. Invited symposium presented at the meeting of the Association for Behavior Analysis, Milwaukee, May, 1981.

Horowitz, F.D. Child development for the pediatrician. In *Pediatric Clinics of North America*. Philadelphia: W.B. Saunders Co., in press.

Horowitz, F.D., Linn, P., Smith, C., & Buddin, B. *Maternal responsivity in relation to developmental outcomes*. Paper presented at the biennial meeting of the Society for Research in Child Development, Boston, April, 1981.

Isaacs, C.D., Embry, L.H., & Baer, D.M. Training family therapists: An experimental analysis. *Journal of Applied Behavior Analysis*, in press.

Isaacs, C.D., Embry, L.H., & Baer, D.M. Assessing generalization of trainee, parent, and child behaviors from the clinic to the home. Paper presented at the 8th Annual Association for Behavior Analysis meetings, Milwaukee, May, 1982.

Jensen, R. KU early education program on last year of federal funds. Lawrence Journal-World, August 23, 1981, p. 3A. (Article about the Early Childhood Institute.)

Jensen, R. Teaching research focuses on learning. Lawrence Journal-World, September 19, 1981, p. 3. (Article about research by Etzel and LeBlanc.)

Kleinke, K.D., Cooper, A.Y., Ruggles, T.R., Etzel, B.C., & LeBlanc, J.M. The effects of verbal instruction and modeling on the acquisition of small motor behaviors. Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Kramer, S.A., Ruggles, T.R., & LeBlanc, J.M. A preliminary investigation of task effects of children's observational learning. Paper presented at the annual convention of the Association for Behavior Analysis, Milwaukee, May, 1982.

Kramer, S.A., Ruggles, T.R., & LeBlanc, J.M. Effects of verbal instructions and contingencies on preschool children's observational learning. Presented at the American Psychological Association, Los Angeles, August, 1981. (ECI Document No. 458)

Kramer, S.A., Ruggles, T.R., & LeBlanc, J.M. The effects of probe trial distribution on children's learning a complex matching task through observation. In Instructional control, learning assessment, and observational learning in groups of normal and atypical children. Invited symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981. (ECI Document No. 459)

LeBlanc, J.M. Behavior analysis techniques applied to difficult learning problems. Presented to the staff of the Anne Sullivan School for the Handicapped, Lima, Peru, May, 1982.

LeBlanc, J.M. Teaching procedures for autistic and severely retarded children. Presented to the staff of the Anne Sullivan School for the Handicapped, Lima, Peru, May, 1982.

LeBlanc, J.M. What can parents of handicapped children do? Presented to the general public and the parents and staff of the Anne Sullivan School for the Handicapped, Lima, Peru, May, 1982.

LeBlanc, J.M. Behavior analysis and child development. Presented to general audience, Central University of Venezuela, Caracas, Venezuela, April, 1982.

LeBlanc, J.M. *Optimal learning environments for preschool children*. Presented to faculty and graduate students, Central University of Venezuela, Caracas, Venezuela, April, 1982.

LeBlanc, J.M. *Procedures for working with children who are difficult to teach*. Presented to faculty and graduate students, Central University of Venezuela, Caracas, Venezuela, April, 1982.

LeBlanc, J.M. *The effects of different instructional procedures on children's learning*. A series of five invited lectures entitled: 1) Introduction to the University of Kansas Child Development Research Laboratories; 2) Instructional control in education; 3) Effects of teacher instructions on learning; 4) Environmental arrangements and group instructional control; and 5) Observational learning and stimulus equivalency in group learning. Presented at the Universidad Nacional Autonoma de Mexico, Escuela Nacional de Estudios Profesionales in Iztacala, Mexico, April, 1981.

LeBlanc, J.M. The parameters of teaching children in group settings. In *Instructional control, learning assessment, and observational learning in groups of normal and atypical children*. An invited symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

LeBlanc, J.M. *Instructing difficult-to-teach children*. Presented to educators, special educators, parents, and preschool educators at the following places: The National Institute of Special Education, Yokasuka, Japan; Yokahama, Japan; Osaka, Japan; Hondo, Amakusa Island, Japan; Kumamoto, Japan; Fukuoka, Japan, 1981.

LeBlanc, J.M., & Ruggles, T.R. Instructing difficult to teach children. *Analysis and Intervention of Developmental Disabilities*, in press.

LeBlanc, J.M., & Ruggles, T.R. Instructional strategies for individual and group teaching. ECI Document No. 460, 1982.

LeBlanc, J.M., & Ruggles, T.R. *The technology of stimulus control: Instructions and observational learning*. Presented to faculty and graduate students at the following institutions: Meio University, Tokyo, Japan; The National Institute of Special Education, Yokasuka, Japan; and Kyushu University, Fukuoka, Japan, 1981.

LeBlanc, J.M., Ruggles, T.R., Kramer, S.A., & Fallows-MacDonald, R. *Observational learning in preacademic group teaching*. Presented to faculty and graduate students, Central University of Venezuela, Caracas, Venezuela, April, 1982.

Leidholt, P.A., Rowbury, T.G., & Baer, D.M. *Training and generalization of participation across five learning formats*. Paper presented at the eighth annual convention of the Association for Behavior Analysis, Milwaukee, May, 1982.

Linn, P., Horowitz, F.D., Buddin, B., Leake, J., & Fox, H. A description of a neonatal intensive care unit. Paper presented at the biennial meeting of the Society for Research in Child Development, Boston, April, 1981.

Miller, C.L. Social and linguistic perception in infancy: Factors related to development of communication. In L. Feagans, C. Harding, M. Greenberg, and J.N. Bohannon (Eds.), The origins and growth of communication (tentative title). N.Y.: Ablex Publishers, in press.

Miller, C.L. Development in the discrimination of male and female voices by infants. Presented to the annual convention of the Canadian Psychological Association, Toronto, Ontario, June, 1981.

Miller, C.L., & Byrne, J.M. The role of temporal cues in the development of language and communication. In L. Feagans, C. Harding, M. Greenberg, and J.N. Bohannon (Eds.), The origins and growth of communication (tentative title). N.Y.: Ablex Publishers, in press.

Mullins, B.S., Fowler, S.A., & Paine, S. RECESS Revisited: The use of peer monitors to reduce negative interactions on the playground. Presented at the Association for Behavior Analysis, Milwaukee, May, 1982.

deNavarrete, T.D., Villalba, D.M., Aangeenbrug, M.H., Kramer, S.A., LeBlanc, J.M., & Etzel, B.C. A comparison of the effects of immediate and delayed feedback on children's responses in an academic group. Presented as part of an invited symposium, Instructional control, learning assessment and observational learning in groups of normal and atypical children. Seventh annual convention of the Association for Behavior Analysis, Milwaukee, 1981.

Paine, S.C. (Chair). Direct instruction: Service, training, and research. Symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Paine, S.C. (Chair). Technologies for mainstreaming. Symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Paine, S.C., & Kennedy-Paine, C.G. Structuring classrooms for success: A direct instruction approach. Workshop presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Paniagua, F.A., Stella, M.E., Holt, W.J., Baer, D.M., & Etzel, B.C. Training correspondence by reinforcing intermediate and verbal behaviors. Child Behavior Therapy, in press.

Peterson, N.L. Education begins at birth. Presented to County Homemakers Extension Unit. Desoto, KS, May, 1982.

Peterson, N.L. *Integrating handicapped preschool programs: Questions and issues*. Presented to the Topeka Association for Retarded Citizens, Topeka, KS, May, 1982.

Peterson, N.L. *Integrating handicapped preschool programs: Questions and issues*. Presented to the staff of the Capper Foundation for Crippled Children, Topeka, KS, May, 1982.

Peterson, N.L. Social integration of handicapped and nonhandicapped preschoolers: A study of playmate selections in two, free play environments. *Topics in Early Childhood-Special Education*, in press.

Peterson, N.L. Preschool education for the handicapped. *Encylopedia for Educational Research*. American Educational Research Association, 1982.

Peterson, N.L. *Social integration of handicapped and nonhandicapped children in mainstreamed intervention programs: The research and the implications for teachers*. Paper presented at the National HCEEP-DEC Conference, Washington, D.C., December, 1981.

Roedel, S.M Public Service Announcements regarding the Institute were taped and aired frequently during late 1981 and early 1982 on KANU, a PBA network station in Lawrence, Kansas.

Roedel, S.M., & Rogers-Warren, A.K. *Dissemination: From researcher to practitioner*. Paper presented in a panel at the meeting of the Council on Exceptional Children, Houston, April, 1982. (ECI Document No. 109)

Rogers-Warren, A.K. *Behavioral ecology: Some working definitions*. Paper presented at the annual meeting of the Association for Behavioral Analysis, Milwaukee, May, 1982.

Rogers-Warren, A.K. Teaching talking in the classroom: Some guides for teachers of young, handicapped children. ECI Document No. 802, 1982.

Rogers-Warren, A.K. Behavioral ecology in classrooms for young handicapped children. *Topics in Early Childhood Special Education*, in press.

Rogers-Warren, A.K. *Naturalistic language teaching for preschool handicapped children*. Invited presentation for the annual meeting of the Handicapped Children Early Education Project directors' meeting. December, 1981.

Rogers-Warren, A.K. *It takes two: Toward a behavioral analysis of mother-child interaction*. Paper presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Rogers-Warren, A.K. Arranging preschool environments for young, handicapped children. ECI Document No. 380, 1981.

Rogers-Warren, A., Paden, L.Y., & Cooper, A.Y. Radio talk program, Town Hall, hosted by Jim Pritchett, Station WHB, Kansas City, Missouri, November, 1981.

Rogers-Warren, A.K., Ruggles, T.R., Peterson, N.L., & Cooper, A.Y. Playing and learning together: Patterns of social interaction in handicapped and nonhandicapped children. *Journal of the Division for Early Childhood*, 1981, *3*, 56-64. (ECI Document No. 326)

Rogers-Warren, A.K., & Warren, S.F. Form and function in language learning and generalization. *Analysis and Intervention in Developmental Disabilities*, in press.

Rogers-Warren, A.K., & Warren, S.F. Parents as environmental engineers. In E. M. Goetz and K.E. Allen (Eds.), *Early childhood education: Special environmental and legal considerations*. Rockville, MD: Aspen Publishing Co., in press.

Rowbury, T.G. *Preacademic math skills for early childhood education*. Workshop presented for PEECH Outreach, Educational Service Center IX, Wichita Falls, TX, June, 1981.

Rowbury, T.G. Preacademic skills for the reluctant learner. In K. E. Allen and E. M. Goetz (Eds.), *Early childhood education: Special problems, special solutions*. Germantown, MD: Aspen Systems Publishers, in press.

Rues, J., Noonan, M.J., Esquith, D., & Janssen, C. *Use of quantitative procedures to assess sensory/motor intervention programs*. Paper presented at the annual conference of the Association for the Severely Handicapped, New York, October, 1981.

Rues, J., & Mulligan, M. *The quantitative assessment of sensory/motor acquisition among handicapped and nonhandicapped infants and young children*. Invited paper presented at the annual meeting of the American Physical Therapy Association, Washington, D.C., 1981.

Ruggles, T.R. *Ethical considerations in research with young children*. Paper presented to the annual conference of the National Association for the Education of Young Children, Detroit, November, 1981. (ECI Document No. 108)

Ruggles, T.R., Cooper, A.Y., & LeBlanc, J.M. Some considerations in assessing and increasing the social interaction of preschool children. ECI Document No. 327, 1981.

Ruggles, T.R., & LeBlanc, J.M. Behavior analysis procedures in classroom teaching. In A. Bellach, M. Hersen, & A. Kazdin (Eds.), *International handbook of behavior modification*. Plenum Press, in press.

Ruggles, T.R., & LeBlanc, J.M. The effects of stimulus presentation modes on discrimination acquisition. Presented in *Basic and applied issues in discriminative stimulus research*, J. M. LeBlanc (Chair), at the annual meeting of the American Psychological Association, Los Angeles, August, 1981.

Ruggles, T.R., & LeBlanc, J.M. Strategies teachers can use to enhance children's learning. In *Instructional control, learning assessment, and observational learning in groups of normal and atypical children*. Invited symposium presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Schreibman, L., & Solnick, J.V. *Analysis of simple arithmetic behavior in developmentally delayed children*: *Generalization and response classes*. Presented at the seventh annual convention of the Association for Behavior Analysis, Milwaukee, May, 1981.

Stella, M.E., Hathaway, V., Villalba, D., Navarrete, T., & Etzel, B.C. *Visual attending patterns of normal and atypical children under two training conditions: Trial-and-error compared to criterion-related cue instructions*. Paper presented at the biennial meeting of the Society for Research in Child Development, Boston, April, 1981.

Sullivan, J.W., & Horowitz, F.D. Infant intermodal perception and maternal multimodal stimulation: Implications for language development. In L. P. Lipsitt (Ed.), *Advanced in Infant Research*, Vol 2. N.Y.: Ablex Publishers, in press.

Van Den Berg, J., Embry, L.H., & Born, D. *The effects of mother-only parent training on father-child interactions*. Paper presented at the 8th Annual Association for Behavior Analysis meetings, Milwaukee, May, 1982.

Villalba, D.M., Navarrete, T.D., Aangeenbrug, M.H., Stella, M.E., Etzel, B.C., & LeBlanc, J.M. The effects of instructions that only indicate discriminative features of S+ versus instructions indicating both S+ and S- features: A comparison made with young children. Presented as part of an invited symposium entitled *Educational assessment and intervention for difficult-to-teach children*. Association for Behavior Analysis, Milwaukee, May, 1981.

Warren, S.F., Baxter, D., Anderson, J., Marshall, A., & Baer, D. Generalization and maintenance of question-asking. *Journal of the Association of the Severely Handicapped*, 1981, *6*, 21-30.

Warren, S.F., & Rogers-Warren, A.K. Language acquisition patterns in normal and handicapped children. *Topics in Special Education*, in press. (ECI Document No. 204)

Warren, S.F., & Rogers-Warren, A.K. *Milieu language teaching*. An invited short course presented at the annual meeting of the American Speech, Hearing, and Language Association, Los Angeles, November, 1981.

Warren, S.F., Rogers-Warren, A., & Buchanan, B.G. A longitudinal analysis of comprehensive language training: Generalization to the real world. Paper presented to the biennial meeting of the Society for Research in Child Development, Boston, April, 1981.

Wedel, J.W., & Fowler, S.A. "Once upon a time...." Structuring storytime at home to teach beginning reading skills. Presented at the Association for Behavior Analysis, Milwaukee, May, 1982.

Wedel, J.W., & Fowler, S.A. "Read me a story, Mom." Using storytime to remediate academic deficits. Paper presented at the seventh annual meeting of the Association for Behavior Analysis, Milwaukee, May, 1981.

Whitehead, B.S., Cooper, A.Y., Ruggles, T.R., Etzel, B.C., & LeBlanc, J.M. The use of teacher attention with primes and a special activity to increase cooperative play in two preschoolers. Poster presented at the eighth annual convention of the Association for Behavior Analysis, Milwaukee, May, 1982.

Wolf, S.S., & Etzel, B.C. Reciprocity marital counseling: A replication and analysis. Behavior Research and Therapy, in press.

## TABLE 32B

## HONORS, AWARDS, CONSULTATIONS DURING YEAR 5

ALLEN:

Allen, K.E. Congressional Science Fellowship--Sponsored by the American Association for the Advancement of Science and the Society for Research in Child Development; spent the 1981-1982 academic year in the office of Congressman Bonker in Washington D.C. working on a variety of social policy issues with emphasis whenever possible on handicapped children and their families.

Allen, K.E. The American Medical Writers Association gave Allen an Award of Excellence for one of the four best texts in the field of Allied Health Services, 1980.

Allen, K.E. Invited to run for President of the National Association for Early Childhood Teacher Educators.

Allen, K.E. Editorial Review Board, Child Care Quarterly

BAER-ROWBURY GROUP:

Baer, D.M. Taught a three-day course on early childhood education. Dominican Republic, May 1981.

COOPER:

Cooper, A.Y. Elected secretary of the Midwest Association for the Education of Young Children, a 12-state regional affiliate group of the National Association for the Education of Young Children.

EMBRY:

Embry, L.H. Consultantship to the State of Nevada Division of Mental Health and Mental Retardation, May 1981.

Embry, L.H. Consultantship to the Douglas County Bert Nash Community Mental Health Center, Lawrence, KS, May-July 1981.

Embry, L.H. Invited presenter for panel discussion on Techniques for making parent training work, seventh annual convention of the Association for Behavior Analysis, Milwaukee, WI, May 1981.

ETZEL:

Etzel, B.C. Consultantship to St. Lukes Hospital Preschool Program for Handicapped Children, Kansas City, MO.

Etzel, B.C. Consultant to the Early Childhood Research program, Universidad Central de Venezuela, Instituto de Psicologia, Caracas, Venezuela, (will consult in April-May, 1982).

FOSTER-RUGGLES:

Foster, C.D. Appointment as Staff Psychologist at the University of California at Irvine, Department of Pediatrics, July 1981.

GUESS:

Guess, D. Has been contacted to arrange the presentation of a series of workshops on the assessment procedures to a preschool education and treatment center in Columbus, Ohio. Mary Jo Noonan will provide this consultation.

HOROWITZ:

Horowitz, F.D. Invited participant at the AVEPANE meetings in Caracas, Venezuela in October 1981. She presented a paper on individual differences and implications for development.

Horowitz, F.D. Was invited to participate in the International Society for the Study of Behavior and Development seminar on Alternatives Methodologies in Intervention Research which was held in Ribierao Preto, Brazil in October 1981. She also gave a presentation at the meeting of the Brazilian Psychological Society there.

LEBLANC:

LeBlanc, J.M. Invited as a speaker by the Japanese Behavior Analysis Association and the Japanese National Institute, November and December, 1981.

LeBlanc, J.M. Consultant, Central University of Venezuela, Child Development Laboratory, Caracus, Venezuela, 1980-present.

LeBlanc, J.M. Consultant, National Institute of Special Education, Yokasuka, Japan, 1981.

LeBlanc, J.M. Consultant, Hamayu Gakuen Institute for Retarded, Amakusa, Japan, 1981.

LeBlanc, J.M. Consultant, Japanese Association Behavior Analysis, Tokyo, Japan, 1981.

LeBlanc, J.M. Consultant, Ann Sullivan School for the Handicapped, Lima, Peru, 1982.

PETERSON:

Peterson, N.L. Served on TADS committee at Chapel Hill, North Carolina to plan the topical workshop in Mainstreaming with Preschool Handicapped Children, held Spring, 1982.

ROGERS-WARREN:

Rogers-Warren, A. Consultantship to the Cambridge State Hospital, Cambridge, MN, June 1981.

Rogers-Warren, A. Guest Associate Editor for Education and Treatment of Children. Boards of Editors, Behavioral Assessment and Analysis and Intervention in Developmental Disabilities.

Rogers-Warren, A. Consultant, Infant Parent Training Center, Houston, Texas, April 1982.

Rogers-Warren, A. Manuscript reviewer, Scott Foresman Publishing Co., 1982.

## TABLE 32C

## PLANNED PUBLICATIONS

Alpert, C.L., Rogers-Warren, A.K. and Anderson, J.R. Training mothers to be incidental language teachers for their children. To be submitted to the *Journal of Applied Behavior Analysis*.

Benedicto, C.G., Fowler, S.A. and Baer, D.M. Training preschoolers accurate self-reinforcement to improve academic performance.

Britten, K.A., Ruggles, T.R. and LeBlanc, J.M. Effects of Stimulus Presentation Sequence Upon Children's Learning. Manuscript submitted for publication, 1982.

Buchman, B., Embry, L.H., and Baer, D.M. Impact of parent training: A multiple in-home settings approach to the assessment of generalization.

Carden-Smith, L.K., and Fowler, S.A. Positive peer pressure: Appointing children as team captains during classroom transitions.

Embry, L.H. and Bronicki, G. An experimental analysis of an ecological intervention to enhance parent involvement in children's educational programs.

Embry, L.H. Aggressive parents, aggressive children: A comparison of abusive and normal families interactions. Article to appear in *Analysis and Intervention In Developmental Disabilities*.

Embry, L.H. and Baer, D.M. Group parent training: Assessment of generalization from classroom to home.

Fowler, S.A., Mullins, B.S. and Kirby, K. Training peers to intervene with aggressive classmates: Analysis of side effects.

Fowler, S.A. and Wedel, J.W. "Read me a story, Mom": Using story time to remediate academic deficits.

Horowitz, F. D. An Atlas of the Neonatal Behavioral Assessment Scale - K.

Isaacs, C.D., Embry, L.H., and Baer, D.M. Assessing generalization of trainee, parent, and child behaviors from the clinic to the home.

MacDonald, R.P.F., Cooper, A.Y., Ruggles, T.R., and LeBlanc, J.M. *Mainstreaming: A procedure to increase its effectiveness*. Manuscript submitted for publication, 1982.

Miller, C.L. Developmental changes in voice classification by infants. Provisionally accepted, by *Infant Behavior and Development*.

Miller, C.L. and Byrne, J.M. Psychophysiologic and behavioral response to auditory stimuli in the newborn. Provisionally accepted by *Infant Behavior and Development*.

Mullins, B.S., Fowler, S.A. and Paine, S. The use of peer monitors to reduce negative interaction on the playground.

Neilsen, L.M. and Rogers-Warren, A.K. Mothers strategies for eliciting verbalizations from their language learning children: a longitudinal analysis. To be submitted to the Journal of Child Language.

Noonan, M.J. and Esquith, D. Comparison of selected and quantitative instruments for assessing sensorimotor skills of severely handicapped individuals. Manuscript submitted for publication, 1982.

Radgowski, T., Allen, K.E., Ruggles, T.R., Schilmoeller, G.L. and LeBlanc, J.M. Delayed Presentation of Feedback in Individual and Group Foreign Language Training. To be submitted to Journal of Applied Behavior Analysis, August, 1982.

Rogers-Warren, A.K., Warren, S.F., Alpert, C.L., and Neilsen, L.M. Mothers as language teachers of their normal and handicapped children. A monograph to be submitted to Child Development.

Ruggles, T.R. and LeBlanc, J.M. The Effect of Stimulus-Response Relationships upon Observational Learning of Children in Academic Groups. To be submitted to Journal of Applied Behavior Analysis, July 1982.

Solnick, J.U. and Baer, D.M. "An Analysis of Multiple Exemplars for Teaching Generalized Number-Numeral Correspondence." Manuscript submitted for publication, 1982.

Van Den Berg, J., Embry, L.H., and Born, D. The effects of mother-only parent training on father-child interactions.

## TABLE 33 A

---

## DISSEMINATION DURING YEAR 4

---

Aangeenbrug, M.H., & Etzel, B.C. A two-year follow-up of results on a group administered learning-assessment task for young children. In, Instructional control, learning assessment and observational learning in groups of normal and atypical children. An invited symposium presented at the annual meeting of the Association for Behavior Analysis, Milwaukee, Wisc., 1981.

Allen, K.E. A good beginning for handicapped children. Keynote address presented at the Parent and Professional Conference on Young Children at Risk, Cleveland State University, March, 1980.

Allen, K.E. Mainstreaming in early childhood education-focus on issues, problems, and research funding. Grant Wood Area Education Agency, Cedar Rapids, March, 1980.

Allen, K.E. Early intervention and the interdisciplinary approach. Paper presented at the 58th Annual International Convention Council of Exceptional Children, Philadelphia, April, 1980.

Allen, K.E. Research in review--Mainstreaming: What have we learned? Young Children, July 1980, 35(5) (Invited)

Allen, K.E. Early intervention with handicapped children. Paper presented at the seventh annual conference of the Association for the Severely Handicapped, Los Angeles, October 1980.

Allen, K.E. Early writing: An historical and developmental perspective. Paper presented at the annual conference of the National Association for the Education of Young Children, San Francisco, November 1980.

Allen, K.E. The language-impaired child in the preschool: The role of the teacher. The Directive Teacher, Winter 1980, 2(3). (Invited)

Allen, K.E. But I worry about behavior management (classroom management, organization, and structure). Young and special, a videotape produced by the Dartmouth Medical School, Hanover, N.H., 1981.

Allen, K.E. Mainstreaming models for preschool education programs. Topics in Early Childhood Education, in press. (Invited)

Allen, K.E., & Hickey, D. Preventive discipline: A developmental and behavioral perspective. Paper presented at the fourth annual conference of the International Foster Parents Association, Kansas City, Mo., May 1980.

Allen, K.E., & Hickey, D. Preventive discipline: A developmental and behavioral perspective. In, *Proceedings: Fourth International Foster Parent Conference*, King George, Va., 1980.

Allen, K.E., & Peterson, N.L. The interdisciplinary approach to early intervention programs. In N.L. Peterson (Ed.), *Early childhood education for the handicapped*. Boston: Little, Brown & Co., in press.

Allen, K.E., & Ruggles, T.R. The analysis of teacher-child interaction patterns in the preschool setting. In E.B. Edgar, N.G. Haring, J.R. Jenkins, & C.R. Pious (Eds.), *Serving young handicapped children: Issues and research*.

Baer, D.M. *Examples of applied behavior analysis with children*. Workshop presented at the University of Edmonton, Alberta, British Columbia, April 1980.

Baer, D.M. *Examples of self-control in preschool children*. Colloquium presented at the University of Missouri at Columbia, April 1980.

Baer, D.M. *Examples of self-control in preschool children*. Colloquium presented at Oklahoma State University, Stillwater, Okla., May 1980.

Baer, D.M. *Examples of self-control in preschool children*. Colloquium presented at Vanderbilt University, Nashville, Tenn., May 1980.

Baer, D.M. *Examples of self-control in preschool children*. Colloquium presented at the University of North Carolina, Greensboro, N.C., May 1980.

Baer, D.M. *Single subject design*. Presentation at Johns Hopkins University, Baltimore, Md., May 1980.

Baer, D.M. *Analysis of baselines in applied research: Still a problem for visual analysis*. Paper presented at the conference on Steady-State Operant Behavior, Manchester, England, July 1980.

Baer, D.M. *Assessment of psycho-technology*. Paper presented at the annual convention of the American Psychological Association, Montreal, August 1980.

Baer, D.M. Imposition of structure on behavior and the demolition of behavioral structures. Paper presented at the Nebraska Symposium on Motivation, Lincoln, Neb., October 1980.

Baer, D.M. *Self-control in young children*. Invited colloquium presented to the faculty and students at Morningside College, Sioux City, Iowa, November 1980.

Baer, D.M., & Bushell, D.R., Jr. *The future of behavior analysis in the schools? Consider its recent past, and then ask a different question*. Presentation at Spring Hill Conference on the Future of Psychology in the Schools, Spring Hill, Minn., June 1980.

Baer, D.M., & Parsonson, B.S. Applied changes from steady state: Still a problem in the visual analysis of data. In C.M. Bradshaw, E. Szaladi, & C.F. Lowe (Eds.), *Quantification of steady state operant behavior*. Amsterdam: Elsevier/North-Holland, 1980.

Baxter, D., Ruggles, T.R., Kramer, S.A., Aangeenbrug, M.H., Etzel, B.C., & LeBlanc, J.M. Manipulation of task size, teacher instructions, and methods of materials presentation to reduce inappropriate behavior of a child in a group teaching setting. In, *Instructional control, learning assessment and observational learning in groups of normal and atypical children*. An invited symposium presented at the annual meeting of the Association for Behavior Analysis, Milwaukee, Wisc., 1981.

Bickel, W.K., Stella, M.E., & Etzel, B.C. *Hypotheses and stimulus control: The assessment and control of children's inferences*. In an invited symposium presented at the annual meeting of the Association for Behavior Analysis, Milwaukee, Wisc., 1981.

Bickel, W.K., Stella, M.E., Ruggles, T.R., & Etzel, B.C. *Assessment of complex auditory stimulus discrimination in preschool children*. Poster session presented at the annual convention of the American Psychological Association, Montreal, Quebec, September 1980. (ECI Document No. 407)

Britten, K., Ruggles, T., & LeBlanc, J. *A comparison of massed and intermixed stimulus presentations*. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Byrne, J. Neonatal assessment: *Theory and implications*. Workshop presented at the 2nd annual South Central Conference on Early Education for the Handicapped, Springfield, Mo., April 1980.

Byrne, J., Sullivan, J., & Horowitz, F.D. *Effects of time and type of feeding on neonatal test performance*. Paper presented at the second International Conference on Infant Studies, New Haven, Conn., April 1980.

Byrne, J.M., & Miller, C.L. *Neonatal responsivity to auditory stimuli: Strategies for early assessment*. Invited address given at the annual meeting of the Missouri Speech and Hearing Association, March 1981.

Byrne, J.M., & Horowitz, F.D. Rocking as a soothing intervention: The influence of direction and type of movement. *Infant Behavior and Development*, in press.

Carden-Smith, L. *Classroom observation code: Covariation between child behavior problems and classroom format variables* (ECI Document No. 507). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, April 1980.

Carden-Smith, L., Fowler, S.A., Solnick, J., & Baer, D.M. The use of team captains to monitor and reinforce appropriate behavior during kindergarten transitions. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Comprehensive Communications Curriculum for the Severely Mentally Handicapped Series: This series of six manuals was prepared by a number of individuals, most of whom were associated with the Kansas Neurological Institute and/or the University of Kansas. The series has been publicized and distributed through the Early Childhood Institute:

Klein, M.D., Myers, S.P., Hogue, B., Waldo, L.J., Marshall, A.M., and Hall, M.K. Parent's guide: Classroom involvement, communication training, resources. ECI Document No. 601, 1981.

Klein, M.D., Vanost-Wulz, S., Hall, M.K., Waldo, L.J., Carpenter, S.A., Lathan, D.A., Myers, S.P., Fox, T., and Marshall, A.M. Comprehensive Communication Curriculum Guide. ECI Document No. 602, 1981.

Myers, S.P., Welch, P., Klein, M.D., Waldo, L.J., and Marshall, A.M. Teacher's Guide to Family Involvement. ECI Document No. 603, 1981.

Waldo, L., Riggs, P., Davaz, K., Hirsh, M., Eye, R., and Marshall, A. Functional Sign Training for the Severely Multiply Handicapped. ECI Document No. 604, 1981.

Waldo, L., Riggs, P., Davaz, K., Hirsh, M., Eye, R., and Marshall, A. Functional Communication Board Training for the Severely Multiply Handicapped. ECI Document No. 605, 1981

Waldo, L.J., Barnes, K.J., and Berry, G.W. Total Communications Checklist. ECI Document No. 606, 1981.

Cooper, A.Y. Promoting social interaction in the classroom. Paper presented at the Native American Preschool Project Early Childhood Conference, Sioux City, Iowa, June 1980.

Cooper, A.Y. Make large group time fun and worthwhile. Workshop presented for PEECH Outreach, Education Service Center--Region IX, Wichita Falls, Texas, August 1980.

Cooper, A.Y. Certification standards and education for teachers of handicapped preschool children. A panel presentation at the annual meeting of the National Association for the Education of Young Children, San Francisco, November 1980.

Cooper, A.Y. Cooperative play code: Cooperative play in an integrated preschool (ECI Document No. 505). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1980.

Cooper, A.Y. *Let the room, the materials and how you present them help you teach young handicapped children and infants.* Invited session for the 3rd annual statewide conference for Special Education Paraprofessionals, Topeka, Kan., March 1981.

Cooper, A.Y., & Fallows, R.P. *Language: A key to social interaction. How do we open the door for delayed preschoolers?* Paper presented at the Midwest Association for the Education of Young Children Annual Conference, Milwaukee, Wisc., April 1980.

Cooper, A.Y., & Kleinke, K. *Language activities and programs for preschoolers with and without language delay.* Invited session presented at the annual meeting of the Kansas Association for the Education of Young Children, Kansas, October 1980.

Dennis, C., Foster, C., & Morgan, D. *Self-monitoring by handicapped children across settings and people.* Poster session presented at the annual meeting of the Association for Behavior Analysis, May 1980.

Dodds, R., Rowbury, T.G., & Baer, D.M. *Facilitation of social interaction with a picture cue training program.* Paper presented at the annual convention of the Association for the Advancement of Behavior Therapy, New York, November 1980.

Drake, J.A., Ruggles, T.R., & LeBlanc, J.M. *Comparison of the effects of backward and forward chaining in teaching a motor sequence to preschool children.* Paper presented at the annual meeting of the American Psychological Association, Montreal, Quebec, September 1980.

Durgan, R.E. *Preacademic behavior code* (ECI Document No. 508). Lawrence, Kan.: Research Institute for the Early Childhood Education of the Handicapped, April 1980.

Durgan, R.E., Lawler, S., & Baer, D.M. *Contingent card turning as a method for increasing on-task behavior in small groups.* Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Durgan, D.W., Rowbury, T.G., & Baer, D.M. *From back-talk to backups: Programming generalized compliance in an appositional child.* Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Embry, D.D. *Can storybooks really change behavior?* Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980. (ERIC No. ED 200 320)

Embry, D.D. *The effects of storybooks on preschooler's outdoor play* (ECI Document No. 379). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, June 1980. (ERIC No. 200 322)

Embry, D.D. Can storybooks really change behavior? (ECI Document No. 378). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1980.

Embry D.D. Designing instructional materials for young children. In, J. J. Gallagher (Ed.), New Directions for Special Education (Vol. 3). San Francisco: Jossey-Bass, Inc., 1980. (ECI Document No. 451)

Embry, D.D., & Malfetti, J.L. Reducing the risk of pedestrian accidents involving preschoolers through parent training and modeling: An experimental analysis in the natural environment (ECI Document No. 302). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, October 1980.

Embry, L.H. Compliance: A crucial but uncooperative measure in adult-child interactions. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Embry, L.H. Two emerging models of parent training: General and problem-specific. Paper presented at the 1st Applied Behavior Analysis Conference of Mexico, Mexico City, February 18-21, 1981. (ECI Document No. 303)

Embry, L.H., & Martin, C. Practical parenting observation system (ECI Document No. 506). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, October 1980. (ERIC No. ED 200 323)

Etzel, B.C. The assessment and training (using errorless programming procedures) of difficult-to-teach children on conceptual tasks. Paper presented at the following places:
- Department of Applied Psychology, University of Uppsala, Uppsala, Sweden, March 26, 1980.
- Health Care Evaluation Research Team Site, University of Southampton, Winchester, England, March 28, 1980.
- Instituto Medico-Psico Pedagogico, Nosta Casa and University of Ancona, Ancona, Italy, April 4, 1980.
- Max Planck Institute of Psychiatry, Munich, Germany, April 8, 1980.
- Instituut voor Orthopedagogiek, Katholieke Universitiet, Hijmegen, Holland, April 15, 1980.

Etzel, B.C. Design and evaluation of instructional materials: Give the kids a fighting chance to learn. Discussant at symposium at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Etzel, B.C. Emerging Womanhood: Behavior analysis of female development. Discussant at symposium at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Etzel, B.C. Who will be the hands-on clinician? In, The present and future of non-Ph.D. clinical psychologists. Symposium presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Etzel, B.C., & LeBlanc, J.M. Instructional and stimulus control procedures for children with learning problems. Invited conversation hour at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Etzel, B.C. Educational assessment and intervention for difficult-to-teach children. Chairperson of an invited symposium presented at the Association for Behavior Analysis. Milwaukee, 1981.

Etzel, B.C., Bickel, W.K., & Stella, M.E. Stimulus control procedures in assessing problem solving skills of normal and atypical children. Analysis and Intervention in Developmental Disabilities, in press.

Etzel, B.C., LeBlanc, J.M., Schilmoeller, K.J., & Stella, M.E. Stimulus control procedures in the education of young children. In S.W. Bijou & R. Ruez (Eds.), Contributions of behavior modification to education. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1981. (Also to be published in Spanish by Editorial Trillas.)

Fallows, R.P., Cooper, A.Y., Etzel, B.C., LeBlanc, J.M., & Ruggles, T.R. The use of a stimulus equivalency paradigm and observational learning in teaching concepts to preschool children. Paper presented at the annual meeting of the American Psychological Association, Montreal, Quebec, September 1980.

Fallows, R.P., Cooper, A.Y., Ruggles, T.R., & LeBlanc, J.M. Manipulation of peer behavior and teacher attention as an antecedent stimulus to increase the social interaction of an isolate child. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Fallows-MacDonald, R.P., Ruggles, T.R., & LeBlanc, J.M. Concept training through a combination of stimulus equivalency and observational learning strategies: An analysis of acquisition rates. Paper presented at the 14th annual convention of the Association for the Advancement of Behavior Therapy, New York, November 1980.

Foster, C. Computers and instructional design. Paper presented to the Department of Educational Technology, San Diego State University, San Diego, California, August 1980.

Foster, C., & Keilitz, I. Empirical bases for content revision of curriculum materials. Invited presentation to Fairview Psychological Association, Costa Mesa, Calif., 1981.

Fowler, S.A. Compliance: Promotion and generalization in home, school, and community settings. Chairperson of symposium presented at the meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Fowler, S.A. Transition from preschool to public school: Current research endeavors. Colloquium presented to the Department of Special Education, University of Maryland at College Park, June 1980.

Fowler, S.A., & Baer, D.M. "Do I have to work hard all day?" Delayed reinforcement as an indiscriminable contingency. Paper presented at the annual convention of the Association for the Advancement of Behavior Therapy, New York, November 1980.

Fowler, S.A., & Baer, D.M. Do I have to work hard all day?: Delayed reinforcement as a generalization facilitation strategy. Journal of Applied Behavior Analysis, in press.

Fowler, S.A., Carden-Smith, L., Dodds, R., & Wedel, J. Facilitating the transition from preschool to public schools. Workshop presented at the Handicapped Children's Early Education Program Conference, Washington, December 1980.

Fowler, S.A., & Smith, L.C. School transfers: Procedures to facilitate the young child's adjustment to new schools. Paper presented at the National Foster Parents Association conference, Kansas City, Mo., May 1980.

Gendreau, S., Buchanan, B., Rogers-Warren, A., & Warren, S.F. Child Verbalization Context Code (ECI Document No. 504). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1980.

Gentry, B. Does mainstreaming insure integration? WESTAR Newsletter, 3(3), June 1980. (ECI Document No. 706)

Gentry, B. Assessing sensorimotor development - Quantifying the measurement. WESTAR Newsletter, 3(4), September 1980. (ECI Document No. 707)

Guess, D., Rues, J., Warren, S., & Lyon, S. Quantitative Assessment of Motor and Sensory/Motor Acquisition in Handicapped and Nonhandicapped Infants and Young Children--Volume I: Assessment Procedures for Selected Developmental Milestones. ECI Document No. 255, 1980.

Guess, D., Janssen, C., Mulligan, M., Noonan, M., & Rues, J. Quantitative procedures for assessing sensory motor skills among handicapped and nonhandicapped children: Reliability and replication. Paper presented at the seventh annual conference of the Association for the Severely Handicapped, Los Angeles, October 1980.

Guess, D., Rues, J., Warren, S., Lyon, S., & Janssen, C. Quantitative assessment of Motor and Sensory/Motor Acquisition in Handicapped and Nonhandicapped Infants and Young Children--Volume II: Interobserver Reliability Results for the Procedures. ECI Document No. 257, 1981.

Hickey, D., & Allen, K.E. Vertical grouping: Meeting a range of needs. Paper presented at the Annual Conference of the Kansas Association for the Education of Young Children, Emporia, Kansas, October 1980.

Higgins, A.F., Stella, M.E., Aangeenbrug, M.H., LeBlanc, J.M., & Etzel, B.C. Analysis of variables controlling intelligible and unintelligible language of a preschool child. In an invited symposium presented at the annual meeting of the Association for Behavior Analysis, Milwaukee, Wisc., 1981.

Holt, W.J., & Etzel, B.C. Programming initial writing. In, Early writing: A developmental approach. Symposium presented at the annual conference of the National Association for the Education of Young Children, San Francisco, November 1980.

Horowitz, F.D. Review of "The ecology of human development" by Urie Bronfenbrenner. Science, 1980, 207, 634-635.

Horowitz, F. D. The first two years of life: Factors related to thriving. In S. Moore & C. Cooper (Eds.), The young child: Reviews of research, Vol. 3. National Association for the Education of Young Children, in press.

Horowitz, F.D. Methods of assessment for at-risk and handicapped infants. In C. Ramey & P. Trohanic (Eds.), Finding and educating high-risk infants. In press.

Horowitz, F.D. & Leake, H. The effects of otitis media on cognitive development. Annals of Otology, Rhinology, and Laryngology, 1980, 89.

Horowitz, F.D., & Linn, P.L. The Neonatal Behavioral Assessment Scale: Assessing the behavioral repertoire of the newborn infant. In M. Walraich (Ed.) Advances in behavioral pediatrics (Vol. 3). Greenwich, Connecticut: JAI Press, Inc., in press.

Horowitz, F.D., Linn, P.L., Buddin, B.J., & Smith, C. Neonatal assessment: Evaluating the potential for plasticity. In T.B. Brazelton (Ed.) New approaches to developmental screening of infants. Johnson and Johnson Baby Products Co. Pediatric Roundtable No. 5, in press.

Horowitz, F.D., Linn, P., Johns-Buddin, B., & Smith, C. Neonatal assessment: Evaluating the potential for plasticity. Chapter to appear in T.B. Brazelton (Ed.) New approaches to developmental screening of infants. Johnson and Johnson Baby Products Company, Pediatric Round Table No. 5. Paper presented as participant of Pediatric Round Table No. 5, October 1980.

Isaacs, C. New therapists: Preschool-age children in the home. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Lancioni, G.E., Horowitz, F.D., & Sullivan, J.W. The NBAS-K: I. A study of its stability and structure over the first month of life. Infant Behavior and Development, 1980, 3, 341-359.

Lancioni, G.E., Horowitz, F.D., & Sullivan, J.W. The NBAS-K: II. Reinforcement value of the infant's behavior. Infant Behavior and Development, 1980, 3, 361-366.

Larsson, D.G., Cooper, A.Y., Ruggles, T.R., & LeBlanc, J.M. The effect of paced instructions, reprimands, and physical guidance on compliance. Paper presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

LeBlanc, J.M. Instructional control procedures for children with learning problems. Paper presented at the following universities and research sites:

Department of Applied Psychology, University of Uppsala, Uppsala, Sweden, March 26, 1980.
Health Care Evaluation Research Team Site, University of Southampton, Winchester, England, March 28, 1980.
Instituto Medico-Psico Pedagogico, Nostra Casa and University of Ancona, Ancona, Italy, April 4, 1980.
Max Planck Institute of Psychiatry, Munich, Germany, April 8, 1980.
Instituut voor Ortopedagogiek, Katholieke, Universitiet, Nijmegen, Holland, April 15, 1980.

LeBlanc, J.M. The role of the master's degree in behavior analysis. Paper presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Linn, P.L. Infant assessment: Clinical and research implications of the Brazelton Neonatal Assessment Scales and other behavioral measurement tools. Instructional course presented at the annual meeting of the American Physical Therapy Association, Reno, Nev., February 20-21, 1981.

Maxwell, J., Foster, C., & Dennis, C. The use of self-control procedures by learning disabled adolescents. Poster session presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

McQuarter, R.J., Warren, S.F., Rogers-Warren, A. The multiple effects of a procedure to increase child verbalizations. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Miller, C., & Horowitz, F.D. Integration of auditory and visual cues in speaker classification by infants. Paper presented at the second annual International Conference on Infant Studies, New Haven, Conn., April 1980.

Miller, C., Younger, B., & Moise, P. The classification of male and female voices in infancy. Paper presented at the second annual International Conference on Infant Studies, New Haven, Conn., April 1980.

Mulligan, M. Quantitative procedures for measuring sensory motor acquisition in severely/multiply handicapped children. Workshop presented at the second annual South Central Conference on Early Education for the Handicapped, Springfield, Mo., April 1980.

Navarrete, T.D., Villalba, D.M., Aangeenbrug, M.H., LeBlanc, J.M., & Etzel, B.C. A comparison of the effects of immediate and delayed feedback on children's responses in an academic group. In an invited symposium presented at the annual meeting of the Association for Behavioral Analysis, Instructional Control, learning assessment and observational learning in groups of normal and atypical children , Milwaukee, 1981.

Nelson, C.A. Infant's perception of visual movement: A review and theoretical analysis (ECI Document No. 256). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, June, 1980. (ERIC No. ED 200 321)

Nelson, C.A., & Horowitz, F.D. What can be concluded about asymmetry of perceived intensity of emotion on the left and right sides of the face? (Comment on Sackeim, Gur, and Sancy, "Emotions are expressed more intensely on the left side of the face.") Science, 1980.

Paine, S.C., & Fowler, S.A. Helping young handicapped children succeed when they begin public school. (ECI Document No. 801). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, December 1980.

Paniagua, F.A., & Baer, D.M. The analysis of correspondence training as a chain reinforceable at any point. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Peterson, N.L. Social interactions in mainstreamed classrooms. Paper presented at the National Conference for the Council on Exceptional Children, Philadelphia, Pa., April 1980.

Peterson, N.L. Early childhood education for the handicapped: What is it all about? Paper presented at the Kansas City Conference on Preschool Handicapped Programs sponsored by Marillac Center for Children, Kansas City, Kan., May 1980.

Peterson, N.L. Emerging patterns of social integration of young handicapped children in mainstreamed and integrated classrooms. Symposium presented at Harvard University, Cambridge, Mass., October 1980.

Peterson, N.L. Mainstreaming in the preschool. Paper presented at the annual meeting of the Kansas Association for the Education of Young Children, Emporia, Kansas, October 1980.

Peterson, N.L. Mainstreaming in reverse: Practices and research findings. Paper presented at Indiana University UAF Clinical Training Center, Bloomington, Indiana, December 1980.

Peterson, N.L. Early intervention with the handicapped. In E. L. Meyen (Ed.) Exceptional children and youth: An introduction (2nd Ed.). Denver: Love Publishing Co., in press.

Peterson, N.L. Preschool education for the handicapped. In Encyclopedia of educational research (5th Ed.). American Educational Research Association, in press.

Polk, X.L., Wright, J., Flanders, P., & Baer, D.M. Discrimination homogeniety as a cue for attempting to solve problems: A generalization study. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Reiber, J., & Embry, L.H. Working with parents: Parents as partners. In K.E. Allen & E.M. Goetz (Eds.), A Handbook: Special Problems in Early Childhood Education. Aspen Publishing, in preparation.

Rogers-Warren, A. Language and behavior analysis. An invited position paper presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

Rogers-Warren, A., McQuarter, R.J., Alpert, C., & Weeks, L.A. Mother-child teaching interaction code. (ECI Document No. 502). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1980.

Rogers-Warren, A.K., Ruggles, T.R., Peterson, N.P., & Cooper, A.Y. Social interaction patterns in normal and handicapped preschool children. Invited paper presented at the annual meeting of the HCEEP Project Directors, Washington, D.C., December 4, 1980.

Rogers-Warren, A.K., Ruggles, T.R., Peterson, N.L., & Cooper, A.Y. Learning and Playing Together: Social Interaction Patterns among normal and handicapped preschoolers. Journal of the Division of Early Childhood, in press.

Rogers-Warren, A.F., & Warren, S.F. Current perspectives in social-ecological research with the mentally retarded. Invited paper presented at the annual meeting of the NICHD Mental Retardation Center Directors, Kansas City, November 18, 1980.

Rogers-Warren, A.K., & Warren, S.F. Pragmatics and generalization of language training. In R.L. Schiefelbusch (Ed.), Communicative competence: Acquisition and intervention. Baltimore: University Park Press, in press.

Rogers-Warren, A.K., & Warren, S.F. Teaching functional language. Baltimore: University Park Press, in press.

Rogers-Warren, A.K., Warren, S.F., & Baer, D.M. Interactional bases of language learning. In K. Kernan, R. Edgerton, & M. Begab (Eds.), Impact of specific settings on the development and behavior of retarded persons. Baltimore: University Park Press, 1981. (ECI Document No. 205)

Rowbury, T.G. Visual and auditory discrimination curriculum for early childhood classrooms. Workshop presented for PEECH Outreach, Education Service Center--Region IX, Wichita Falls, Tex., June 1980.

Rowbury, T.G., & Baer, D.M. Applied analysis of preschool children's behavior. In D. Glenwide & L. Jason (Eds.), *Behavioral community psychology*. New York: Praeger, 1980.

Rues, J. *Application of quantitative procedures to measure motor acquisition in a cerebral palsied population*. Interdisciplinary Core Course, children's Rehabilitation Unit, University Affiliated Facility, Kansas University Medical Center, Kansas City, Kansas, October 1980.

Ruggles, T.R. Some considerations in the use of teacher-implemented observation procedures. In K.E. Allen & E.M. Goetz (Eds.), *Serving young handicapped children: Issues and research*. Aspen Press, in press.

Ruggles, T.R., & LeBlanc, J.M. *Mediated transfer and observational learning in teaching discriminations to preschool children*. Paper presented at the annual meeting of the American Psychological Association, Montreal, Quebec, September 1980.

Ruggles, T.R., & LeBlanc, J.M. Instructional strategies for individual and group teaching. ECI Document No. 461.

Sandman, C., Swanson, J., & Foster, C. *Neurochemical influences on attention in retardation*. Paper presented at joint research seminar of Fairview State Hospital and University of California at Irvine, September 1980.

Stella, M.E., & Etzel, B.C. *Normal and atypical visual attending patterns: Assessment and intervention*. Paper presented at the annual convention of the Kansas Pyshological Association, Topeka, Kan., March 1980.

Stella, M.E., & Etzel, B.C. *Visual attention patterns during errorless and trial-and-error learning of normal and atypical children* (ECI Document No. 406). Lawrence, Kan.: Kansas Research Institute for the Early Childhood of the Handicapped, July 1980.

Stella, M.E., & Etzel, B.C. Visual attentional patterns during errorless and trial-and-error learning of normal and atypical children. In, *Evaluating strategies for promoting efficient learning and performance*. Symposium presented at the annual meeting of the American Psychological Association, Montreal, Quebec, September 1980.

Stella, M.E., & Etzel, B.C. *The effectiveness of criterion related correction procedures*. Part of an invited symposium presented at the Association for Behavior Analysis. Milwaukee, 1981.

Sullivan, J., & Horowitz, F.D. *Synthesizing commentary for mother/child*. Paper presented at the second annual International Conference on Infant Studies, New Haven, Conn., April 1980.

Villalba, D.M., Navarrete, T.D., Aangeenbrug, M.H., Stella, M.E., Etzel, B.C., & LeBlanc, J.M. *The effects of instructions that only indicate the discriminative features of S+, versus instructions indicating both S+ and S- features: A comparison made with young children*. Part of an invited symposium presented at the annual meeting of the Association for Behavior Analysis, Milwaukee, Wisc., 1981.

Warren, S.F., & Rogers-Warren, A.K. Practical applications of a generalization technology for teaching language skills. Invited paper presented at the annual meeting of RIP project staff, Nashville, Tenn., October 2, 1980.

Warren, S.F., & Rogers-Warren, A. Child/teacher language rate code (ECI Document No. 142). Lawrence, Kan.: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1980.

Warren, S.F., & Rogers-Warren, A. Current perspectives in language remediation. Education and Treatment of Children (Vol. 3), 2, 1980.

Warren, S.F., & Rogers-Warren, A. Current perspectives in language remediation: A special monograph. Education and Treatment of Children, 1980, 5, 133-153.

Warren, S.F., & Rogers-Warren, A.K. Setting variables affecting the display of trained noun referents by retarded children. In K. Kernan, R. Edgerton, & M. Begab (Eds.), Impact of specific settings on the development and behavior of retarded persons. Baltimore: University Park Press, 1981.

Weeks, L.A., Rogers-Warren, A., McQuarter, R.J., & Albert, C. The form and intent of mother's speech to language learning children. Paper presented at the annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May 1980.

The AAA Foundation for Traffic Safety has distributed 1,000 copies of D. Emory's research on pedestrian safety for preschoolers. These copies were distributed largely to practitioners and relevant administrators in the United States. About 50 copies have been sent to researchers in the U.S. and abroad.

The Parent Program staff made presentations to three classes of undergraduate and graduate students on parenting handicapped children, living with young children, and child abuse.

The Parent Program staff made presentations about child-management skills and the Parent Program itself to the following groups: The Foster Parent Association of Douglas County, Head Start program parents, USD #497 public school services for young handicapped children and their families, the Advisory Board for Children's Services of the local community mental health center, and the Menninger Foundation's children's services staff.

## TABLE 33B

## HONORS AND AWARDS DURING YEAR 4

Allen, K.E. Chairperson of the Program Advisory Committee (Panel S) Society for Research in Child Development, 1980-81.

Allen, K.E. Member, National Advisory Board, Project SERVICE, Department of Psychiatry, Dartmouth Medical School, 1980-

Allen, K.E. Editorial Board, Topics in Early Childhood Special Education (TECSE), 1980-present.

Allen, K.E. Congressional Science Fellowship, 1981-82.

Byrne, J.M. Recipient of the J.A. Burzle Scholarship.

Cooper, A.Y. Elected President of the Kansas Association for the Education of Young Children beginning October 1980.

Embry, L.H. Elected chairperson of the Social Learning Group on Family Therapy at the annual meeting of the Association for the Advancement of Behavior Therapy. Her responsibilities include the organization and direction of next year's 2½-day meeting of this special interest group.

Etzel, B.C. Invited to be a visiting professor during 1981-82. Universidad Central de Venezuela, Facultad de Humanidades y Educacion, Escuela de Psicologia, Caracas, Venezuela.

Etzel, B.C. Awarded the: Japan Society for the Promotion of Science fellowship for research in Japan between April 1, 1981, and March 31, 1982.

Etzel, B.C. Invited to teach a one-week seminar to the Experimental Psychology Faculty of the Escuela Nacional de Estudios Profesionales-Iztacala, Coordinacion General de Investigacion, Universidad Nacional Autonoma de Mexico. April, 1981. Title of seminar: "The Effects of Stimulus Control Procedures on Children's Learning."

Foster, C.A. Appointed as Lecturer, Department of Special Education, California State University at Fullerton, Fullerton, California and at the Department of Special Education, San Diego State University, San Diego, California.

Horowitz, F.D. NIMH review panel member, "Cognition, emotion, and personality."

LeBlanc, J.M. Member-at-Large, Executive Committee, Experimental Analysis of Behavior, Division 25 of the American Psychological Association, 1980-present.

LeBlanc, J.M. Editorial Board, Analysis and Intervention in Developmental Disabilities, 1980-present.

LeBlanc, J.M. Editorial Board, Behavior Research of Severe Developmental Disabilities, 1980-present.

LeBlanc, J.M. Invited by the Japanese Behavior Analysis Association to consult with Japanese professionals during the International Year of Disabled Persons, October 1981.

LeBlanc, J.M. Invited to teach a 1-week seminar to the Experimental Psychology staff and students at the Universidad Nacional Autonoma de Mexico in the spring of 1981.

Rogers-Warren, A.K. Board of Editors, Journal of the Association for the Severely Handicapped.

Rogers-Warren, S.K. Review Panel member for grants, Kansas Heart Association, March 1981.

## TABLE 33C

## WORKSHOPS AND CONSULTATIONS DURING YEAR 4

Allen, K.E. Consultant, Stanford Early Childhood Laboratory Preschool, Palo Alto, California, 1980.

Allen, K.E. Consultant, Doan College Early Childhood Program, Crete, Nebraska, 1980.

Allen, K.E. Consultant, Metera Infants' Center, Athens, Greece, 1980.

Baer, D.M. Consultantship, Children's Research Group, University of North Carolina, Chapel Hill, N.C., September, 1980 (research methodology).

Czernicki, V.M. Brazelton reliability seminars. Consultantship with Washington University Medical School, St. Louis, Missouri.

Embry, D.D. Pedestrian safety for preschoolers. Workshop presented at the annual meeting of the Kansas Association for the Education of Young Children, Emporia, Kansas, October 1980.

Embry, D.D. Consultantship, Children's Television Workshop, New York, 1980.

Embry, D.D. Consultantship, Detroit Public Schools Headstart Program, Pedestrian Safety, Detroit, Michigan, 1980.

Etzel, B.C. Consultant, Central University of Venequela, Child Development Laboratory, Caracas, Venezuela, 1980-present.

Etzel, B.C., & LeBlanc, J. Will be consulting with professionals from Venezuela, beginning with a visit by Professor Miriam Dembo from the University of Central Venezuela, Caracas, Venezuela, October 1980. Ms. Thais Navaretta and Ms. Doris Villaba, also from the University of Venezuela, are visiting the University of Kansas for a year to learn our experimental procedures and how to set up and maintain a child experimental laboratory.

Foster, C. Consultantship at Fairview State Hospital, Costa Mesa, Claifornia, June 1980.

Fowler, S.A. Consultantship for Department of Psychology, University of West Virginia, to develop classroom curriculum and management system for two new experimental preschool classrooms, June 1980.

Fowler, S.A. Consultantship, Children's Learning Center (a research-based preschool), Department of Psychology, West Virginia University, Morgantown, W. Virginia, November 1980.

Fowler, S.A. Transition from preschool to public school for young handicapped children. Workshop presented to the Central Minnesota Consortium for Special Education, St. Cloud, Minnesota, February 21, 1981.

Gaddis, E. Brazelton workshop and colloquium presentation. Texas A & M University, College Sataion, Texas, February 2-5, 1981.

Janssen, C. Developmental assessment of handicapped clients. Consultantship at Sioux Vocational School, Sioux Falls, South Dakota, November 1980.

LeBlanc, J.M. Consultant, Central University of Venezuela, Child Development Laboratory, Caracus, Venezuela, 1980-present.

Linn, P.L. Infant Assessment: Clinical and research implications of the Brazelton Neonatal Assessment Scales and other behavioral measurement tools. Instructional course presented at the American Physical Therapy Association annual meeting. Reno, Nevada, February 20-21, 1981.

Rogers-Warren, A.K. Consultantship, Cambridge State Hospital, Cambridge, Minnesota, December 1980.

Rogers-Warren, A.K. Consultantship, Cambridge State Hospital, Cambridge, Minnesota, October 1980.

Rogers-Warren, A.K. Consultantship, Comprehensive Communication Curriculum Demonstration Project, Kansas Neurological Institute, Topeka, Kansas.

Rogers-Warren, A.K. Consultant, Cambridge State Hospital and Training Center, Cambridge, Minnesota, January 1981.

Rogers-Warren, A.K. Consultantship, WESTAR (Technical assistance for Colorado State University, Greeley, Colorado, Language Intervention Program Personnel), Feburary 1981.

Smith, C. Consultantship with the University of Alabama Medical School, Brazelton reliability seminars.

483

## TABLE 34

## DISSEMINATION DURING YEAR 3

Aangeenbrug, M.H., Stella, M.E., Holt, W.J., & Etzel, B.C. An in-class teacher administered preschool cognitive assessment and intervention procedure. Paper presented at the 13th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, December, 1979.

Allen, K.E. Early education for handicapped and nonhandicapped children--The integrated program. Paper presented at South Central Educational Cooperative, Mankato, Minn., February, 1979.

Allen, K.E. Behavioral principles and practices. Paper presented at Region XVII Education Service Center, Lubbock, Texas, March, 1979.

Allen, K.E. Organization of the early learning environment. Paper presented at the University of Nevada, Las Vegas, March, 1979.

Allen, K.E. Perceptual factors in children's learning. Discussion paper presented at the American Educational Research Association, San Francisco, April, 1979.

Allen, K.E. The functional approach: A developmental design. In A functional approach to the management of problem areas in preschool education. Symposium presented at the annual meeting of the Council for Exceptional Children, Dallas, Texas, April, 1979.

Allen, K.E. Early math experiences and the facilitative adult. Paper presented at the annual convention of the National Association for the Education of Young Children, Atlanta, November, 1979.

Allen, K.E., Wedel, J., & Embry, D. The Kansas Institute for Early Childhood Education--Implications for community-based programs. Paper presented at the President's Committee on Mental Retardation, Task Group on Environmental Concerns and Minority Affairs, Juniper Gardens, Kansas City, Kansas, March, 1979.

Allen, K.E., Wedel, J., & Embry, D. The Kansas Research Institute for Early Childhood Education of the Handicapped: A description of research activities. Paper presented at the International Conference of the Association for Children with Learning Disabilities, San Francisco, March, 1979.

Allen, K.E. Mainstreaming in early childhood education. Albany, N.Y.: Delmar Publishers, 1980.

Allen, K.E., Ruggles, T.R., & LeBlanc, J.M. *Initiation and interaction code: Teacher-to-child and child-to-teacher* (ECI Document No. 501). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, March, 1979.

Alley, G.R., & Foster, C.D. Non-discriminatory testing of minority and exceptional children. In E.L. Meyen, G.A. Vergason, & R.J. Whelan, *Instructional planning for exceptional children*. Denver: Love Publishing Co., 1979.

Britten, Karen, Ruggles, T.R., & LeBlanc, J.M. *A comparison of massed and intermixed stimulus presentations*. Paper presented at the 13th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, December, 1979.

Cooper, A.Y., Martin, H., & Schloesser, P. *Family health and child development support services: Prevention and treatment*. Discussion session at the Kansas White House Conference on Families, Wichita, Kansas, March, 1980.

Cooper, A.Y., Ruggles, T.R., & LeBlanc, J.M. Teaching techniques for increasing positive social interactions of disruptive children. In, *A functional approach to the management of problem areas in preschool education*. Symposium presented at the annual meeting of the Council for Exceptional Children, Dallas, Texas, April, 1979.

Cooper, A.Y., & Wedel, J. *Programming for the handicapped child in the preschool setting*. Paper presented at the Preschool-Kindergarten Conference, Lawrence, Kansas, September, 1979.

Davies, C.S., & Embry, D.D. Faculty development: A protocol for instructional technologists. *Improving Human Performance Quarterly*, 1979, *8*, 92-101.

Embry, D.D. *Designing instructional materials for young children* (ECI Document No. 451). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, March, 1979.

Embry, D.D., Disseminating research findings: A blueprint for affecting educational research and practice. *Educational Technology*, 1979, *19*, 23-27. (ECI Document No. 103)

Embry, D.D. Designing instructional materials for young children. In J.A. Gallagher (Ed.), *New directions in special education*. San Francisco: Jossey-Bass, Inc., in press.

Embry, L.H. Analysis, assessment, and development of family support for handicapped preschool children: A review. In J.A. Gallagher (Ed.), *New directions in special education*. San Francisco: Jossey-Bass Inc., in press.

Embry, L.H., & Baer, D.M. *Analyzing generalization of training effects*. Paper presented at the fifth annual convention of the Association for Behavior Analysis, Dearborn, Mich., June, 1979.

Embry, L.H., Buchman, B.M., Isaacs, C., Martin, C., & Rogers-Warren, A. An ecobehavioral analysis of community interaction patterns of families with handicapped or nonhandicapped children. Paper presented at the fifth annual convention of the Association for Behavior Analysis, Dearborn, Mich., June, 1979.

Embry, L.H., Kelley, M., Herbert-Jackson, E., & Baer, D.M. Group parent training: An analysis of generalization from classroom to home (ECI Document No. 301). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, February, 1979. (ERIC No. ED 193 859)

Etzel, B.C. Stimulus control in educational programming for autistic children. Invited workshop presented at the Twin Cities Society for Autistic Children, Minneapolis, Minn., April, 1979.

Etzel, B.C. Who will be the hands-on clinician? In The present and future of non-Ph.D. clinical psychologists. Symposium to be presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May, 1980.

Etzel, B.C., & LeBlanc, J.M. The simplest treatment alternative: The law of parsimony applied to choosing appropriate instructional control and errorless learning procedures for the difficult-to-teach child (ECI Document No. 405). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, October, 1979.

Etzel, B.C., & LeBlanc, J.M. The simplest treatment alternative: The law of parsimony applied to choosing appropriate instructional control and errorless learning procedures for the difficult-to-teach child. Journal of Autism and Developmental Disorders, 1979, 9, 361-382.

Etzel, B.C., LeBlanc, J.M., Schilmoeller, K.J., & Stella, M.E. Stimulus control procedures in the education of young children (ECI Document No. 455), Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, November, 1979.

Etzel, B.C., LeBlanc, J.M., Schilmoeller, K.J., & Stella, M.E. Stimulus control procedures in the education of young children. In S.W. Bijou and R. Ruez (Eds.), Contributions of behavior modification to education. Hillsdale, N.J.: Lawrence Erlbaum Associates, in press (also to be published in Spanish by Editorial Trillas).

Foster, Carol D. Use of the data base management system. Three seminars presented for the staff of the Early Childhood Institute, University of Kansas, 1979.

Foster, Carol D., Lerner, Esther, & Owen, Martha. Use of the data base management system. Two seminars presented for the staff of the Early Childhood Institute, University of Kansas, April and May, 1979.

Foster, C.D., Lewis, P.J., Tucker, D.J., Foster, R.W., & Gentry, B. Skill acquisition program bibliography. Lawrence, Kansas: Camelot Behavioral Systems, 1979.

Fowler, S.A., & Smith, L.C. *Research on strategies for mainstreaming handicapped children*. Symposium presented for the Psychology Department at the University of Nebraska Medical Center, Meyer Children's Rehabilitation Institute, Omaha, Neb., April, 1979.

Fowler, S.A. Transition to public school. In K.E. Allen, *Mainstreaming in early childhood education*. Albany, N.Y.: Delmar Publishers, 1980, 242-254.

Fowler, S.A., & Rowbury, T.G. Transition and follow-up teachniques for assisting children in early public school placement. In, *Preparing children with behavioral problems for public school*. Symposium presented at the Midwest Association for the Education of Young Children, St. Louis, Missouri, April, 1979.

Fowler, S.A., Rowbury, T.G., & Baer, D.M. Do I have to be good all day?: Delayed reinforcement as a promoter of cross-setting generalization. Manuscript submitted to the *Journal of Applied Behavior Analysis*, February, 1980.

Fowler, S.A., Smith, L.C., & Durgan, R.E. Extending direct and indirect services from the preschool to the kindergarten for children with developmental problems. In, *A Functional Approach to the Management of Problem Areas in Preschool Education*. Symposium presented at the annual meeting of the Council for Exceptional Children in Dallas, Texas, April, 1979.

Gardner, Ann. Kids learn safety in the street. *Lawrence Daily Journal World*, Sept. 16, 1979. (Article about Lynne and Dennis Embry's consulting with the West German government about pedestrian safety for children.)

Gentry, Barbara. Preparation for tomorrow: Interagency cooperation. *WESTAR Newsletter*, December, 1979, *3* (1), 12-13. (ECI Document No. 704)

Gentry, B. *Preparation for tomorrow: KU child research abstracts* (ECI Document No. 106 ). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, March, 1980.

Gentry, Barbara. What babies can tell us: Research at the KU Infant Lab. *WESTAR Newsletter*, 1980, in press. (ECI Document No. 705)

Gentry, Barbara, & Embry, D.D. Teaching Kelly to communicate. *WESTAR Newsletter*, Fall, 1979, *2* (4), 4-7. (ECI Document No. 703)

Gentry, B., & Fowler, S.A. *Progress toward better early intervention programs: Research strategies*. Paper presented at the 17th International Conference of the Association for Children with Learning Disabilities, Milwaukee, Wisc., February, 1980.

Goldstein, D.R., Cooper, A.Y., Ruggles, T.R., & LeBlanc, J.M. A teaching package for increasing compliance in oppositional child during pre-academic activities. In, A functional approach to the management of problem areas in preschool education. Symposium presented at the annual meeting of the Council for Exceptional Children, Dallas, Texas, April, 1979.

Guess, D. & Rues, J. The development of quantitative procedures to measure sensory/motor acquisition in handicapped and nonhandicapped infants and young children. Paper presented at the national conference of the AAESPH, Chicago, October, 1979. (About 350 people attended the session.)

Guess, D., Rues, J., Warren, S., Lyon, S., Mulligan, M., Lehr, D., Janssen, C. Murphy, N., Fosage, K., & Barnes, K. Quantitative assessment of motor and sensory/motor acquisition in handicapped and nonhandicapped infants and young children. ECI Document No. 254, 1979.

Haralick, Joy, & Peterson, Nancy L. The sociology of education: Integration of handicapped and nonhandicapped young children. Paper presented at the American Sociological Association National Conference, Boston, Mass., August, 1979.

Hass, S.L., Ruggles, T.R., & LeBlanc, J.M. Minimal versus critierion-related detailed instructions (ECI Document No. 453). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1979.

Hass, S.L., Ruggles, T.R., & LeBlanc, J.M. The effects of criterion-related and noncriterion-related detailed instruction on teaching preschoolers a word recognition task. Paper presented at the 13th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, December, 1979.

Horowitz, F.D. The effects of otitis media on cognitive development. Paper presented at the second International Symposium on Otitis Media, Ohio State University, Columbus, Ohio, March, 1979.

Horowitz, F.D. Improving our knowledge of children's thought: Introduction to the section. American Psychologist, 34 (10), October, 1979, 892-3.

Horowitz, F.D. Design factors in the assessment of intelligence. Annals of Otology, Rhinology, and Laryngology, Supplement 60, #88(5), Part 2, September-October, 1979, 64-77.

Horowitz, F.D. The importance of infancy. Keynote address at the International Congress on Early Childhood Education, Israel, January, 1980.

Horowitz, F.D. Receptive language development in the first year of life. In J.A. Gallagher (Ed.), New directions for exceptional children. San Francisco: Jossey-Bass, Inc., 1980, 1-20.

Horowitz, F.D. Intervention and its effects on early development: What model of development is appropriate? In, R.R. Turner & H.W. Reese (Eds.), Life-span developmental psychology: Intervention. New York: Academic Press, 1980, 235-248.

Horowitz, F.D. The first two years of life: Factors related to thriving. In S. Moore & C. Cooper (Eds.), The young child: Reviews of research, Vol. 3. in press.

Horowitz, F.D. Methods of assessment for at-risk and handicapped infants. In C. Ramey & P. Trohanic (Eds.), Finding and educating the high-risk infant, in press.

Horowitz, F.D. Stability and instability in neonatal behavior: Quest for elusive threads. SRCD Monographs.

Kelley, M.L., Embry, L.H., & Baer, D.M. Training parents in child management skills and family-support skills for maintenance. Behavior Modification, 1979, 3.

Kramer, S., Ruggles, T.R., & LeBlanc, J.M. The effects of imposing time limits on the responses of preschool children. Paper presented at the 13th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, December, 1979.

LeBlanc, J.M. Women and professional goals. Invited discussion at the fifth annual convention of the Association for Behavior Analysis, Dearborn, Mich., June, 1979.

LeBlanc, J.M. Training and hiring non-Ph.D. psychologists. In, The present and future of non-Ph.D. clinical psychologists. Symposium to be presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May, 1980.

LeBlanc, J.M., & Etzel, B.C. Instructional and stimulus control procedures for children with learning difficulties. Invited discussion to be presented at the sixth annual meeting of the Association for Behavior Analysis, Dearborn, Mich., May, 1980.

Linn, P. Assessment of infant environments: A review of the literature (ECI Document No. 376). Lawrence, Kansas: Research Institute for the Early Childhood Education of the Handicapped, March, 1979. (ERIC No. ED 194 181)

McQuarter, R.J., Rogers-Warren, A., & Warren, S.F. Normal and delayed language development: A quantitative analysis. Paper presented at the 87th annual meeting of the American Psychological Association, New York, September, 1979.

Owen, Martha. Use of the datatrieve system. Three seminars presented for the staff of the Early Childhood Institute, University of Kansas, November and December, 1979.

Peterson, Nancy L. Preschool education for the handicapped: Approaches and issues. Paper presented at the Kaw Valley Chapter for the Council on Exceptional Children, 1979.

Peterson, Nancy L. *Research on the integration of preschool handicapped and nonhandicapped children and the KU Early Childhood Institute*. Presentation to the University of Kansas Department of Psychology, Lawrence, Kansas, Fall, 1979.

Peterson, Nancy L. *Activities and progress of the KU Early Childhood Research Institute*. Presentation to faculty of the University of Kansas Department of Special Education (Medical Center and Lawrence Campus), Fall, 1979.

Peterson, Nancy L. *Peterson's preschool observation for social interaction within integrated or mainstreamed classrooms: The classroom form*. Copies of the code have been disseminated to individuals within several states across the country.

Peterson, N.L. *Comparison of social interaction patterns and integration of handicapped and nonhandicapped children across three preschool settings*. Paper to be presented at the national conference for the Council on Exceptional Children, Philadelphia, Pa., April, 1980.

Peterson, N.L. *Program development and research on preschool education for the handicapped*. Paper to be presented at the University of Alabama, Huntsville, Ala., April, 1980.

Rogers-Warren, A. *Issues in early intervention: A Kansas perspective*. Paper presented at the annual meeting of the American Association for Mental Retardation, Miami, Florida, May, 1979.

Rogers-Warren, A.K. *Facilitating the generalization of newly trained language*. Invited paper presented at the annual HCEEP Directors Meeting, Washington, D.C., December 7, 1979.

Rogers-Warren, A.K. *Child research at the University of Kansas*. Invited presentation for the Optimist Club, Lawrence, Kansas, January 22, 1980.

Rogers-Warren, A., Guess, D., & Rues, J. *The assessment of motor development in normal and handicapped children*. Invited paper presented at the annual HCEEP Directors Meeting, Washington, D.C., December 7, 1979.

Rogers-Warren, A., & Lathrop, N.A. *Telling it like it is: Reinforcing reports of activity choice*. Paper presented at the fifth annual meeting of the Association for Behavior Analysis, Dearborn, Michigan, June, 1979.

Rogers-Warren, A., & Warren, S.F. Mands for verbalization: Facilitating the display of newly taught language. *Behavior Modification*, 1980, *4*, 361-382.

Rogers-Warren, A.K., & Warren, S.F. *The assessment and facilitation of language generalization*. Invited short course presented at the annual meeting of the American Speech, Language, and Hearing Association, Atlanta, Ga., November 16, 1979.

Rogers-Warren, A., Warren, S.F., Alpert, C., McQuarter, R.J., & Weeks, L.S. *Teaching talking: An analysis of mother-child interactions*. Paper presented at the 87th annual meeting of the American Psychological Association, New York, September, 1979.

Rogers-Warren, A.K., Warren, S.F., & Baer, D.M. Interactional Bases of language learning. In K. Kernan, R. Edgerton, & M. Begab (Eds.), Impact of specific settings on the development and behavior of retarded persons. Baltimore: University Park Press, 1980, in press.

Rogers-Warren, A.K., Warren, S.F., & Stremel-Campbell, K. Making language functional. Baltimore: University Park Press, 1980, in press.

Rogers-Warren, A.K., Warren, S.F., & Wedel, J. Pragmatics and generalization of language training. In R.L. Schiefelbusch (Ed.), Communicative competence: Acquisition and intervention. Baltimore: University Park Press, 1980, in press.

Rogers-Warren, Ann. Language and behavior analysis. An invited position paper to be presented at the sixth annual meeting of the Association of Behavior Analysis, Dearborn, Michigan, May, 1980.

Rowbury, T.G. Procedures for managing group participation skills in special children. Paper presented at the annual meeting of the Council for Exceptional Children, Dallas, Texas, April, 1979.

Ruggles, T.R., & LeBlanc, J.M. Observation method in applied behavior analysis (ECI Document No. 452). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, March, 1979.

Ruggles, T.R., & LeBlanc, J.M. Variables which affect the effectiveness of group training procedures designed for children with learning problems. Invited paper presented at the 12th annual Gatlinburg Conference in Mental Retardation and Developmental Disabilities, Gulf Shores, Ala., April, 1979.

Ruggles, T.R., & Wagner, G. Teacher implemented observation system. In, A functional approach to the management of problem areas in preschool education. Symposium presented at the annual meeting of the Council for Exceptional Children, Dallas, Texas, April, 1979.

Scott, L.C., & Goetz, E.M. Issues in the collection of in-class data by teachers. Education and Treatment of Children, 1980, 3 (1), 65-71.

Self, P., & Horowitz, F.D., Overview of neonatal assessment. In Joy Osofsky (Ed.), Handbook of infant behavior and development. New York: Wiley-Interscience, 1979.

Stella, M.E., & Etzel, B.C. Manipulation of visual orientation on correct (S+) stimuli during acquisition (ECI Document No. 454). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, March, 1979.

Stella, M.E., & Etzel, B.C. Application of recent findings in errorless stimuli control technology. Paper presented at the 12th annual Gatlinburg Conference in Mental Retardation and Developmental Disabilities, Gulf Shores, Ala., April, 1979.

Stella, M.E., & Etzel, B.C. A case of training eye orientations of difficult-to-educate children: Visual scanning differences between normal and retarded children. Paper presented at the 13th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, December, 1979.

Stella, M.E., Etzel, B.C. Cross-Modal equivalence and cross-modal transfer: Do you observe and report or train and explain? ECI Document No. 456, 1979.

Stella, M.E., & Etzel, B.C. The use of probe designs for measuring acquisition and some dimensions of procedural variation that might affect that measurement: A literature review. ECI Document No. 1979.

Sullivan, Joseph. Intermodel perception in infancy and its implications for receptive language development (ECI Document No. 202). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped. March, 1979.

Sullivan, J.W., & Horowitz, F.D. A comparison of neonatal behavior with infant temperment. Paper presented at the 87th annual meeting of the American Psychological Association, New York, September, 1979.

Warren, S.F., & Rogers-Warren, A. Current perspectives in language remediation (ECI Document No. 203). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, September, 1979.

Warren, S.F., & Rogers-Warren, A.K. Current perspectives in language remediation: A special monograph. Education and Treatment of Children, 1980, 5, in press.

Warren, S.F., & Rogers-Warren, A.K. Setting variables affecting the display of trained noun referents by retarded children. In K. Kernan, R. Edgerton, & M. Begab (Eds.), Impact of specific settings on the development and behavior of retarded persons. Baltimore: University Park Press, 1980, in press.

Warren, S.F., Rogers-Warren, A., Baer, D.M., & Guess, D. The ASsessment and facilitation of language generalization. In W. Sailor, B. Wilcox, & L. Brown (EDs.), Methods of instruction for severely handicapped students. Baltimore: Brooks Publishers, 1980.

## TABLE

## DISSEMINATION DURING YEAR 2 .

Allen, K.E. Consultant, Oakland University, Project Early, Rochester, Mich., 1978.

Allen, K.E. Consultant, Kaw Valley Unified School District, St. Marys, Kan., 1978.

Allen, K.E. Consultant, McComb Intermediate School District, Mt. Clemons, Mich., 1978.

Allen, K.E. Early intervention and integration: Implications for research. Paper presented at the First World Congress on Future Special Education, Stirling, Scotland, June, 1978.

Allen, K.E. The early childhood education specialist (ECES). In K.E. Allen, V.A. Holm, & R.L. Schiefelbusch (Eds.), Early intervention: A team approach. Baltimore: University Park Press, 1978.

Allen, K.E. Early intervention and integration: Implications for research. In A. Fink (Ed.), International perspectives on futures of special education. Reston, Va.: Council for Exceptional Children Publishing, Inc., 1978.

Allen, K.E. The teacher therapist: Teaching parents to help their children through systematic contingency management. Journal of Special Education Technology, 1979.

Allen, K.E., Budd, K., Fowler, S., Peterson, N., Rowbury, T.G., & Thompson, B. The IEP: A practical priority in early childhood education. In Bluma Weiner (Ed.), Periscope: Views of individualized education programs. Reston, Va.: Council for Exceptional Children Publishing, Inc., 1978.

Allen, K.E., Holm, V.A., & Schiefelbusch, R.L. (Eds.), Early intervention: A team approach. Baltimore: University Park Press, 1978.

Allen, K.E., & Rowbury, T.L. Teaching strategies for early childhood education environments (ECI Document No. 450 ). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1978. (ERIC No. ED 201 158)

Alley, G.R., & Foster, C.D. Non-discriminatory testing of minority and exceptional children. Focus on Exceptional Children, 1978, 9, 1-14.

Baer, D., & Parsonson, B. Descriptive statistics in aid of the eye. ECI Document No. 104, 1978.

Cooper, A.Y. *Developing social skills in an integrated preschool classroom*. Paper presented at the annual meeting of the Midwest Association for the Education of Young Children, St. Louis, April, 1979.

Douglas, T., Radgowski, T.A., Allen, K.E., & LeBlanc, J.M. A simple intervention program for the remediation of the misarticulated "L" in a preschool child's speech. *Education and Treatment of Children*, 1978, *1*.

Early Childhood Institute Staff. Tantrums, frustrations, hugs, and love--or working with families with young children, ECI Document No. 701, 1978.

Embry, D.D. Disseminating research findings: A blueprint for affecting educational research and practice. *Educational Technology*, 1978, *19*(3). (ECI Document No. 103)

Embry, D.D. Parent program: Research and service. *WESTAR Newsletter*, 1979, *3*(1), 9-11.

Embry, D.D. *Guidelines for disseminating child development research from large grants*. Paper presented at the annual meeting for the Society for Research in Child Development, San Francisco, March, 1979.

Embry, D.D. A comprehensive, not apprehensive view of mainstreaming. *WESTAR Newsletter*, March, 1979, *2*(2), 9-11. (ECI Document No. 702)

Embry, D.D. Workshop on Pedestrian Safety for Preschoolers, Oread Neighborhood Association, Lawrence, Kan., 1979.

Embry, D.D. Consultant, Safety Education Project, Columbia Teachers' College, New York, 1979.

Embry, L.H. *The parent program: A model for parent education for families of handicapped and non-handicapped children*. Paper presented at a conference on support services for parents of developmentally disabled children, Parsons, Kan., October, 1978.

Embry, L.H. *The junior colleague model of graduate education at the University of Kansas*. Paper presented at the meeting of the Society for Research in Child Development, San Francisco, March, 1979.

Embry, L.H. *Research on parent-child interactions: Implications for parent education*. Invited paper presented at the Ira Gordon Memorial Conference, Chapel Hill, N.C., June, 1979.

Embry, L.H. *Child management skills for parents*. Workshop presented at the Special Education Services Cooperative of the Unified School District, Wamego, Kan., 1979.

Embry, L.H. *Child management skills for teachers*. Workshop presented for the Seaman Unified School District 345, Topeka, Kan., 1979.

Embry, L.H. An ecobehavioral analysis of community interaction patterns of families with handicapped or nonhandicapped children. Paper presented at the fifth annual meeting of the Association for Behavior Analysis, Dearborn, June, 1979.

Embry, L.H. Workshop at Special Education Services Cooperative of Unified School District, Wamego, Kan., 1979.

Embry, L.H. Workshop for the Seaman Unified School District 345, Topeka, Kan., 1979.

Embry, L.H. Workshop for the Foster Care Parents Association, Lawrence, Kan., 1979.

Embry, L.H., & Herbert-Jackson, E. When and where does it hurt: A survey of parenting problems. Paper presented at the fourth annual meeting of the Midwestern Association for Behavior Analysis, Chicago, May, 1978.

Embry, L.H., Kelley, M.L., Herbert-Jackson, E., & Baer, D.M. Group parent training: An analysis of generalization from classroom to home. Paper presented at the 12th annual convention of the Association for the Advancement of Behavior Therapy, Chicago, November, 1978.

Etzel, B.C. A review of intervention approaches based on learning assessment. ECI Document No. 401, 1978.

Etzel, B.C., & LeBlanc, J.M. Workshop at the conference of the Association for the Advancement of Behavior Therapy, Chicago, 1978.

Etzel, B.C., & LeBlanc, J.M. Workshop for the Twin Cities Society for Autistic Children, Minneapolis, Minn., 1978.

Etzel, B.C., LeBlanc, J.M., Schilmoeller, K.J., & Stella, M.E. Stimulus control procedures in the education of young children. Invited address at Eighth International Symposium on Behavior Modification Caracas, Venezuela, February, 1978. (ECI Document No. 455)

Foster, C.D. Relationships among traditional and behavior assessment procedures in a behavioral research program. ECI Document No. 403, 1978. (ERIC No. ED 196 206)

Foster, C.D. Documentation of child progress. Paper presented at the first conference of BEH Institutes on Intervention and Assessment of Developmentally Handicapped Infants, Chapel Hill, N.C., June, 1978.

Fowler, S.A. Ecological Considerations in the Education and Integration of Young Handicapped Children. ECI Document No. 377, 1978.

Fowler, S.A. Transition procedures for children with special problems. Paper presented at the annual meeting of the Council for Exceptional Children, Kansas City, Mo., May, 1978.

Fowler, S.A., Baer, D.M., & Rowbury, T.G. *The effect of delayed reinforcement on preschool children's generalization across settings*. Paper presented at the Association for the Advancement of Behavior Therapy, Chicago, November, 1978.

Fowler, S.A., & Rowbury, T.G. Workshop Institutes for the Council for Exceptional Children in Cincinnati, Ohio, 1978; Vancouver, B.C., Canada, 1978; and Mankato, Minn., 1979.

Guess, D. *An overview of the Kansas Early Childhood Institute*. Paper presented at the annual meeting of the Council on Exceptional Children, April, 1979.

Guess, D., & Rues, J. *Quantitative procedures for measuring sensory/motor acquisition*. Paper presented at the annual meeting of the Council on Exceptional Children, April, 1979.

Guess, D., Rues, J., Warren, S.A., Lyon, S., Mulligan, M., Lehr, D., Janssen, C., Murphy, N., Fosage, K., & Barnes, K. *Assessment procedures for selected developmental milestones* (ECI Document No. 254 ). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education for the Handicapped, 1979.

Guess, D., Warren, S., Rues, J. A review of selected literature: Assessment of motor and sensory/motor skills in severely/multiply handicapped infants and young children. ECI Document No. 251, 1981. (ERIC No. ED 196 205)

Hass, S.L., Ruggles, T.R., & LeBlanc, J.M. *Minimal versus criterion-related detailed instructions*. Paper presented at the biennial meeting of the Society for Research in Child Development, San Francisco, March, 1979.

Horowitz, F.D. *A literature review: Receptive language development in the first year of life*. Paper presented at the third annual Symposium on Child Language, Lawrence, Kansas, June, 1978.

Horowitz, F.D. Receptive language development in the first year of life: A selective review of the literature. ECI Document No. 201, 1978.

Horowitz, F.D. *The importance of infancy*. Keynote address at the annual conference on Infant Psychiatry, San Francisco, March 1979.

Horowitz, F.D. Receptive language development in the first year of life. In J.A. Gallagher (Ed.), *New directions in special education*, San Francisco: Jossey-Bass, Inc., in press.

Horowitz, F.D. Intervention and its effects on early development: What model of development is appropriate? In R.R. Turner & H.W. Reese (Eds.), *Life-span developmental psychology: Intervention*. New York: Academic Press, in press.

Horowitz, F.D., Sullivan, J.W., & Linn, P. Stability and instability in newborn infants: The quest for elusive threads. In A. Sameroff (Ed.), The Brazelton Neonatal Behavior Assessment Scale: A commentary. *Monographs of the Society for Research in Child Development*, 1978, *43*, 29-45.

Janssen, C.M. Review of measurement instruments and procedures for assessing visual behaviors: Implications for quantitative measurement. (ECI Document No. 252). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1979.

Lancioni, G. Conditioning in infancy and implications for intervention programs. ECI Document No. 250, 1978.

LeBlanc, J.M. A technology of educational and clinical procedures for instructing the difficult-to-teach. An invited workshop with B.C. Etzel and L. Schreibman. Presented at American Association for Advancement of Behavior Therapy, Chicago, November, 1978.

LeBlanc, J.M. Instructional Control while Teaching Children with Learning Problems. Invited address at the Twin Cities Society for Autistic Children, Minneapolis, Minnesota, April, 1979.

LeBlanc, J.M. The effects of instructions on the learning process of normal and developmentally delayed preschool children. ECI Document No. 402, 1978.

LeBlanc, J.M., Etzel, B.C., & Domash, M.A. A functional curriculum for early intervention. In K.E. Allen, V.A. Holm, & R.L. Schiefelbusch (Eds.), Early intervention: A team approach. Baltimore: University Park Press, 1978.

Lehr, D.H. Review of measurement instruments and procedures for assessing mobility behaviors: Implications for quantitative measurement (ECI Document No. 253.5). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1979.

Mulligan, M. Review of measurement instruments and procedures for assessing reach and grasp behaviors: Implications for quantitative measurement. (ECI Document No. 119). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1979.

Parker, S.D., & Rowbury, T.G. Sequencing curriculum for children with special problems. Paper presented at the annual meeting of the Council for Exceptional Children, Kansas City, Mo., May, 1978.

Parker, S.D., Rowbury, T.G., & Baer, D.M. The effect of experimentally induced item mastery on preferences among preacademic items. Paper presented at the meeting of the Association for the Advancement of Behavior Therapy, Chicago, November, 1978.

Paul, L., & Rogers-Warren, A. A comparative analysis of verbal interactions between normal and language-delayed preschoolers. Paper presented at the 86th annual meeting of the American Psychological Association, Toronto, August, 1978.

Paul, L., Rogers-Warren, A., & Spradlin, J. Teaching children to talk to one another. Paper presented at the fourth annual meeting of the Midwestern Association for Behavior Analysis, Chicago, May, 1978.

Peterson, N.L., & Cooper, A.Y. The social-ecology of intervention strategies for young handicapped children (peer interactions and teacher-child interaction patterns). ECI Document No. 325, 1978.

Radgowski, T., Allen, K.E., Ruggles, T.R., & LeBlanc, J.M. Delayed presentation of feedback in preschool group foreign language training. Presented at American Psychological Association, Toronto, Canada, September 1978.

Radgowski, T.A., Allen, K.E., Ruggles, T., & LeBlanc, J.M. *Errorless responding of preschool children in group and individual training of a foreign language with delayed feedback*. Poster session presented at the convention of the American Psychological Association, Toronto, September, 1978.

Radgowski, T.A., Allen, K.E., Ruggles, T.R., Schilmoeller, G., & LeBlanc, J.M. *Errorless responding of preschool children in group and individual training of foreign language with delayed feedback*. Paper presented at the 86th annual meeting of the American Psychological Association, Toronto, August 1978.

Rogers-Warren, A. *Language remediation: Practical and theoretical implications*. Paper presented at the fourth annual meeting of the Midwestern Association for Behavior Analysis, Chicago, May, 1978.

Rogers-Warren, A., & Warren, S.F. The mand-model technique: An extension of the Hart/Risley incidental teaching model. *Behavior Modification*, in press.

Rogers-Warren, A., Warren, S.F., & Owen, M. *Measurement and analysis of generalized language usage: A baseline report*. Paper presented at the 102nd annual meeting of the American Association on Mental Deficiency, Denver, May, 1978.

Rogers-Warren, A., Warren, S.F., Stremel-Campbell, K., & Baer, D.M. *The assessment and facilitation of language generalization*. Symposium presented at the fifth annual meeting of the American Association for the Education of the Severely/Profoundly Handicapped, Baltimore, October, 1978.

Rogers-Warren, A., & Wedel, J. The physical ecology of preschool classrooms for the handicapped: A review of literature. In J.A. Gallagher (Ed.), *New directions for exceptional children*, San Francisco: Jossey-Bass Inc., in press. (ECI Document No. 375) (ERIC No. ED 187 437)

Ruggles, T.R., & LeBlanc, J.M. *Behavior contrast and instructed discrimination: Further analysis*. Paper presented at the 86th annual meeting of the American Psychological Association, Toronto, August, 1978.

Schilmoeller, G.F., Schilmoeller, K.J., Etzel, B.C., & LeBlanc, J.M. Conditional discrimination after errorless and trial-and-error training. *Journal of Experimental Analysis of Behavior*, May, 1979, *31*, 405-420.

Stella, M.E., & Etzel, B.C. Manipulation of visual orientation on correct (S+) stimuli during acquisition. Paper presented at the biennial meeting of the Society for Research in Child Development, San Francisco, March, 1979. (ECI Document No. 454)

Stella, M.E., & Etzel, B.C. Application of recent findings in errorless stimulus control technology. In J.A. Mulick (Chair), Applications of programmed instruction research in education and training of the mentally retarded. Symposium presented at the 12th annual meeting of the Gatlinburg Conference on Research in Mental Retardation and Developmental Disabilities, Gulf Shores, Alabama, April, 1979.

Stella, M.E., & Etzel, B.C. A review of the blocking effect, with suggestions for future research that may apply to difficult-to-teach children (ECI Document No. 404). Lawrence, Kansas: Kansas Research Institute for the Early Childhood Education of the Handicapped, 1979.

Warren, S.F. Workshop at the Orient State Hospital and Training Center, Orient, Ohio, 1979.

Warren, S.F., Baer, D.M., & Rogers-Warren, A. Teaching children to praise: A problem in stimulus and response generalization. Child Behavior Therapy, in press.

Warren, S.F., Rogers-Warren, A., Baer, D.M., & Guess, D. The assessment and facilitation of language generalization. In W. Snilor, B. Wilcox, & L. Brown (Eds.), New directions in the education of the severely handicapped, Seattle, Wash.: AAESPH, 1979, in press.

Warren, S.F., Rogers-Warren, A., Halle, J., & Paul, L. Prompting generalized language usage: Studies evaluating environmental interventions. Paper presented at the 102nd annual meeting of the American Association on Mental Deficiency, Denver, May, 1978.

Warren, S.F., Rogers-Warren, A., & Owen, M. Tricks of the trade: The measurement and analysis of complex generalized language usage. Paper presented at the fourth annual meeting of the Midwestern Association for Behavior Analysis, Chicago, May, 1978.

Wedel, J., & Harkness, J. To grow and learn. Slide and audio-taped presentation for the annual meeting of the Association for Children with Learning Disabilities, San Francisco, March, 1979.

# CHAPTER VI TRAINING

## Introduction

A major goal of the Research Institute has been to capitalize on the investment in programmatic research by offering research training experiences. In contrast to academic training departments which must first invest in faculty to offer sequences of courses and seminars and then seek research practicum and internship opportunities, the Institute, by design, could function as a laboratory for purposes of research training. The intent was not to design a training curriculum that accommodates the full range of experiences required in a training program to prepare researchers. Rather, the emphasis was on identifying operational functions within the Institute that are representative of tasks performed by researchers. Having done this, research positions in the form of traineeships were structured to provide an experimental base for the training dimension of the Institute.

## Training Model

The Institute's training model was an extension of the junior colleague model, developed by the Department of Human Development and Family Life. The model centers on the sponsor-trainee relationship, and the pattern of experiences mutually agreed upon for the trainee. Once the trainee obtains a sponsor, the level of entry into the teaching program is determined, and the aim becomes the trainee's ultimate functioning as an independent investigator. The practice involves two levels of participation. The first entails developing readiness for the second, and includes the acquisition of research skills through participation in actual research tasks, courses, seminars, and specific tasks assigned by the sponsor. The second shifts into a pattern in which the trainee originates research ideas, designs studies, manages research, and in the process, moves from closely supervised to independent research. The following primary objectives were incorporated into the model:

1) selection of trainees with interests in developing research skills related to the education of young children and with backgrounds appropriate to the research mission of the Institute;
2) provision of in-depth research training experiences that incorporated into the research functions of the Institute and were not contrived for purposes of training;
3) differentiation of research training experiences on the basis of performance readiness model. Experiences were designed within two general levels (i.e., predoctoral and postdoctoral); and
4) coordination of academic programs with the Departments of Human Development and Family Life and Special Education to insure degree avenues for students seeking research training through the resources of the Institute.

Predoctoral trainees were assigned to individual investigators with whom they worked on a day-to-day basis. Trainees participated in the implementation and design of research being carried out by the Institute.

While beginning trainees were supervised closely by the cooperating investigator, trainees were allowed more independence in developing research ideas and carrying out research as their expertise increased.

Postdoctoral trainees in the Institute exemplify a dimension of training that lies between two contrasting role stereotypes. One stereotype is the postdoctoral assignment to carry out a well-specified program of studies, each already planned in terms of its logic, goals, methods, subjects, and timelines. What remains for the trainee is to implement that plan. The other stereotype is the postdoctoral assignment to respond to the general mission of the Institute, by developing and pursuing research relevant and valuable to the problems of assessing and intervening successfully into early handicapping conditions that make educational programs problematic. In fact, Institute postdoctoral trainees operated between these two extremes, some closer to one end of the dimension than the other, depending on their sponsor and their area. The Institute researchers had already set out a series of studies as the Institute began, many of them thoroughly planned. In these cases, their postdoctoral trainees carried out, for the most part, nearly complete task analyses. But each researcher also had specific studies that were much less thoroughly developed, usually because of their dependence on the details of the outcome of early or logically prior studies. In the execution of those latter studies, postdoctoral trainees have had ample opportunity, and strong expectation, to make original contributions in conception, design, measurement technique, data analysis, and further proposals. Thus, post-doctoral trainees served as collaborators and also, increasingly, as emerging independent investigators, some of whom have proposed separate research programs of their own, additions to the Institute's overall program, and/or have gone elsewhere to extend work to other research and application settings.

## Training Activities

| | |
|---|---|
| 1) Trainee Seminars | -Periodic meetings in which investigators present their current work<br>-Presentations by outside consultants and speakers on issues related to early childhood and handicapping conditions (a total of 15 trainee seminars were offered) |
| 2) Research Seminars | -Weekly meetings of Institute investigators with the trainees working on their area to discuss ongoing research and planning issues |
| 3) Independent Research | -Participation as a principal investigator in projects related to Institute research areas (typically resulting in theses or dissertations) |

4) Working as a member of a research team; included in research team activities were experience and training in:

- A) Observational and data collection
- B) Data management
- C) Computer applications in behavioral research
- D) Statistical analysis of data
- E) Literature research and retrieval methods
- F) Report and grant writing
- G) Designing studies in behavioral research

## Summary

A total of 101 predoctoral and 6 postdoctoral students received traineeships through the Early Childhood Institute. Most of these students were from the departments of Human Development and Special Education; however, students from Social Work, Clinical Psychology, Educational Psychology, and Administrative Foundations of Higher Education have also been among our trainees. Approximately 90 theses and dissertations have been completed which are related to the research conducted through the Early Childhood Institute.

In addition to students receiving support through Institute traineeships, a large number of graduate students in the departments of Human Development and Special Education have benefited from the training efforts of the Institute by participating in trainee seminars and workshops; by contributing to the working paper series; through involvement with research teams in various areas; and through enrollment as practicum students in settings where applied research sponsored by the Institute was conducted.

A list of trainees is presented in Table 36. While a number of students listed were not on the Institute payroll, their work as graduate students brought them into contact with Institute personnel and research activities. Table 36 also provides information, when available, about theses and dissertation titles, ECI positions titles and current position titles.

## TABLE 36

---

## TRAINEES AND GRADUATE STUDENTS AFFILIATED WITH THE INSTITUTE

---

INVESTIGATOR: EILEEN ALLEN

Student Name: Linda Eigenberg

Dates with ECI: 8/16N/79 - 5/30/80 (Trainee 75%)

Current Position/Title:

Dissertation/Thesis Title:

Student Name: Diedre Hickey

Dates with ECI:

Current Position/Title: 10/16N/79 - 5/15/80 (12.5%), 7/1/80-8/15N/80 (50%), 9/1/80 - 5/15N/81 (13%)

Dissertation/Thesis Title: The Effectiveness of Teacher-Collected Data in Analyzing Children's Free-Choice Activity Preferences; Gender and Age Biases

INVESTIGATOR: DONALD BAER

Student Name: Susan Fowler

Dates with ECI: 9/78 - 5/79 (student), 6/79 present (Research Associate)

Current Position/Title: Research Associate; Assistant Professor (courtesy appt.)

Dissertation/Thesis Title: Timing of Delayed Reinforcement and Feedback in Preschool Children's Generalization across Settings (Dissertation)

INVESTIGATORS: DONALD BAER & SUSAN FOWLER

Student Name: Clara G. Benedicto

Dates with ECI: 9/19 - 12/80

Current Position/Title: Instructor, Dept of Psych, Univ. of Santo Domingo

Dissertation/Thesis Title: Training Preschoolers Accurate Self-Reinforcement to Improve their Academic Performance

Student Name: Lisa Carden-Smith *

Dates with ECI: 9/78 - 12/80

Current Position/Title: PASS Program Coordinator, Dept. of Psych., Meyer Children's Rehabilitation Inst., Univ. of Nebraska Med Center
Dissertation/Thesis Title: The Classroom Observation System: A Method for Assessing the Classroom Behavior of Preschool and Kindergarten Children (Thesis)

Student Name: Robert E. Durgan

Dates with ECI: 9/78 - 8/79

Current Position/Title: Instructor, Dept of Education, Morningside College, Sioux City Iowa
Dissertation/Thesis Title: In progress

Student Name: Frank Kohler

Dates with ECI: 1/82 - 5/82

Current Position/Title: Research Assistant

Dissertation/Thesis Titel: The Use of Peers to Promote Social Interaction in a Negative Isolate Kindergartener (Thesis)

Student Name: Susan B. Mullins

Dates with ECI: 6/80 - 5/82

Current Position/Title: Research Assistant

Dissertation/Thesis Title: RECESS Revisited: The Use of Peer Monitors to Reduce Negative-Aggressive Behavior on the Playground (Thesis)

Student Name: Stan C. Paine

Dates with ECI: 8/80 - 7/81

Current Position/Title: Research Associate, Univ. of Oregon

Postdoctoral Trainee

*Student also listed with another investigator.

Student Name: Jay V. Solnick

Dates with ECI:

Current Position/Title:

Postdoctoral Trainee

Student Name: Luis Zapata

Dates with ECI:

Current Position/Title:

Dissertation/Thesis Title: Generalization of Safety Concepts (Dissertation)

INVESTIGATOR: ALITA COOPER

Student Name: Rebecca P. Fallows

Dates with ECI: Fall 1978 - Spring 1980

Current Position/Title: Ph.D. Candidate, Trainee at Kansas Neurological Inst.

Thesis/Dissertation Title: Manipulation of Peer Behavior and Teacher Attention as an Antecedent Stimulus to Increase the Social Interaction of an Isolated Child (Thesis)

Student Name: Debra R. Goldstein

Dates with ECI: Fall 1977 - Spring 1979

Current Position/Title: Family & Education Coordinator on the Winnebago Indian Reservation, Winnebago, Nebraska

Thesis/Dissertation Title: A Further Investigation of Paced Instructions and an Effective Alternative (Thesis)

Student Name: Sandra Thomas

Dates with ECI: Fall 1981 (not on payroll)

Current Position/Title: Graduate Student, Early Childhood & Behavior Analysis

Dissertation/Thesis Title: Research in progress

INVESTIGATOR: ALITA COOPER (cont.)

Student Name: Kimberly Kleinke

Dates with ECI:

Current Position/Title:

Dissertation/Thesis Title: The Effects of Verbal Instructions and Modeling and Acquisition of Small Motor Behaviors (Thesis)

Student Name: Barbara Whitehead

Dates with ECI: Fall 1980 - Spring 1982

Current Position/Title: Graduate Student, MA in Early Childhood & Behavior Analysis

Dissertation/Thesis Title: The Use of Teacher Praise with Primes and a Special Activity ot Increase Cooperative Play in a Preschool Child (Thesis)

INVESTIGATOR: LYNNE EMBRY

Student Name: Bruce Buchman *

Dates with ECI: Aug 1978 - present

Current Position/Title: Research Assistant

Dissertation/Thesis Title: Assessment of Generalization of Parenting Skills to Everyday Routines (Dissertation)

Student Name: Dana MacMurray

Dates with ECI: 6/81 - 12/81

Current Position/Title: Free lance illustrator, Missoula, Montana.

Dissertation/Thesis Title: None.

Student Name: Hossein Manoocheri

Dates with ECI: 8/79 - 12/81

Current Position/Title: Doctoral candidate in History at University of Kansas.

Dissertation/Thesis Title:

INVESTIGATOR: LYNNE EMBRY (cont.)

Student Name: Suzanne Pate

Dates with ECI: 2/71 - 7/80, 9/81 - present

Current Position/Title: Research Assistant

Dissertation/Thesis Title:

Student Name: John Vandenberg

Dates with ECI: 2/80 - present

Current Position/Title:

Dissertation/Thesis Title: The Impact of Mother Only Parent Training on Father-Child Interactions

INVESTIGATOR: BARBARA ETZEL

Student Name: Mary H. Aangeenbrug

Dates with ECI: 8/77 - present

Current Position/Title: Acting Instructor, Research Associate in Human Development, Lab. Supervisor in Child Development Laboratories

Dissertation/Thesis Title: An In-Class Teacher Administered Preschool Cognitive Learning-Assessment

Student Name: Debra K. Baxter (Co-Advised with J. LeBlanc)

Dates with ECI: 8/79 - 5/81

Current Position/Title: Primary Teacher on Indian Reservation

Dissertation/Thesis Title: The Relationship of Teacher Behaviors to a Child's Attending and Task-related Behaviors in a Preschool Preacademic Group

Student Name: Warren K. Bickel

Dates with ECI: 6/79 - present

Current Position/Title: Graduate Student Research Assistant and Pre-Doctoral Fellowship (NICHHD)

Dissertation/Thesis Title: Assessment of Auditory Selective Attention in Preschool Children

INVESTIGATOR: BARBARA ETZEL (cont.)

Student Name: Vaughn Hathaway *

Dates with ECI:

Current Position/Title:

Dissertation/Thesis Title: None; Procedural and Equipment Training

Student Name: Ann Frances Higgens

Dates with ECI:

Current Position/Title:

Dissertation/Thesis Title: The Effects of Rate of Teacher Vocalization and Teacher Primes on the Verbal Interaction of a Socially Isolated and Language-Delayed Preschool Child

Student Name: Annabelle L. Nelson

Dates with ECI: 1977

Current Position/Title: Director of Adult Education, Prescott College, Prescott, Arizona

Dissertation/Thesis Title: An Analysis of the Component Skills of a Number Task

Student Name: Ellen Ruth Schnur

Dates with ECI: 8/81 - present

Current Position/Title: Graduate Student

Dissertation/Thesis Title: A Pretraining Procedure for Verbal Blending Skills of a Number Task

Student Name: M. Elizabeth Stella

Dates with ECI: August 1977 - present

Current Position/Title: Post-doctoral Fellow, National Institute of Child Health and Human Development (NICHHD)

Dissertation/Thesis Title: Training Visual Discriminations: An Analysis of Errorless Learning Procedures and Visual Attention Patterns with Normal and Atypical Children

INVESTIGATOR: CAROL FOSTER

Student Name: Bruce Buchman *

Dates with ECI: 8/78 - present

Current Position/Title: Trainee/Research Assistant

Dissertation/Thesis Title: Assessment of Generalization of Parenting Skills to Everyday Routines (Dissertation)

Student Name: Linda Cooke

Dates with ECI: 9/77 - 6/78 (Trainee)

Current Position/Title:

Dissertation/Thesis Title:

Student Name: Suzanne Grant

Dates with ECI: 10/78 - present

Current Position/Title: Manager, Data Base Management System

Dissertation/Thesis Title: Schedules of Reinforcement with Experimenter vs. Subject Controlled Reinforcer Offset and Duration (Dissertation)

Student Name: Greg Long *

Dates with ECI: 8/79 - present

Current Position/Title: School Psychologist, Olathe, Kansas

Dissertation/Thesis Title: A Descriptive Analyses of Unstructured Social Interactions and Free Play Behavior of Handicapped and Nonhandicapped Preschoolers (Dissertation)

Student Name: Melissa Moore

Dates with ECI: 9/78 - 6/81

Current Position/Title: Department Trainee, Human Development & Family Life

Dissertation/Thesis Title:

INVESTIGATOR: CAROL FOSTER (cont.)

Student Name: Mark Pittner

Dates with ECI: 9/77 - 6/78

Current Position/Title: Trainee

Dissertation/Thesis Title

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN

Student Name: David Esquith

Dates with ECI: 1980 - 1982

Current Position/Title: Doctoral Student, Special Education

Dissertation/Thesis Title: In progress

Student Name: Cynthia Janssen

Dates with ECI: 1978 - 1982

Current Position/Title: Coordinator of Education for the Severely Handicapped, Philadelphia, PA

Dissertation/Thesis Title: Quantitative Measurement of Visual Fixation Skills in Nonhandicapped Infants: A Validation Study (Dissertation)

Student Name: Kathy Kremer

Dates with ECI: 1978 - 1979

Current Position/Title: Teacher, Severely Muliply Handicapped classroom

Dissertation/Thesis Title: The Development of Quantitative Procedures to Measure Crawling in Handicapped and Nonhandicapped Infants and Children (Thesis)

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: Donna Lehr

Dates with ECI: 1978 - 1981

Current Position/Title: Assistant Professor, Univ. of Wisconsin at Milwaukee

Dissertation/Thesis Title: Effects of Practice Opportunities on Acquisition of Discrimination Skills Among Severely Handicapped Students (Dissertation)

Student Name: Greg Long *

Dates with ECI: 8/79 - present

Current Position/Title: Trainee

Dissertation/Thesis Title:

Student Name: Marilyn Mulligan

Dates with ECI: 1978 - 1981

Current Position/Title: Project Coordinator, USOE funded contract

Dissertation/Thesis Title: The Effects of Massed, Distributed, and Spaced Trial Sequencing on Severely Handicapped Students' Performance (Dissertation)

Student Name: Mary Jo Noonan

Dates with ECI: 1979 - 1982

Current Position/Title: Assistant Professor, Special Education, University of Hawaii (8/82)

Dissertation/Thesis Title: Evaluating Neurodevelopmental Theory and Training with Cerebral Palsied, Severely Handicapped Students (Dissertation)

Student Name: Jan Rues

Dates with ECI: 1977-1982

Current Position/Title: Director, OT Services, Kansas University Med Center/University Affiliated Facility

Dissertation/Thesis Title: Quantitative Measurement of Head Erect in the Prone and Supported Sitting Position in Nonhandicapped Infants (Dissertation)

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: R. Eye

Dates with ECI: 1980 - 1982

Current Position/Title: Coordinator, Deaf-Blind Servises, KSDE

Dissertation/Thesis Title: Assessment of Visual Fixation Behavior Among Severely Handicapped and Nonhandicapped Infants and Children (Thesis)

Student Name: E. Meilard

Dates with ECI:

Current Position/Title: OT Consultant to classroom teachers

Thesis Title The Development of Quantitative Measurement Procedures to Measure Transfer Skills in Handicapped and Nonhandicapped Preschoolers

Student Name: K. Leitner

Dates with ECI: 1979 - 1980

Current Position/Title: Teacher, Severely Multiply Handicapped classroom

Thesis Title: A Quantitative Assessment Procedure for Measuring Crawling Behavior

Student Name: K. Barnes

Dates with ECI: 1977 - 1978

Current Position/Title: Instructor, University of Texas

Thesis Title: Quantitative Assessment of Sitting Skills for Severely Multiply Handicapped Children

Student Name: P. Day

Dates with ECI: 1978 - 1979

Current Position/Title: recently moved to Seattle, Washington

Thesis Title: A Quantitative Assessment Procedure for Measuring Rolling Behavior

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: L. Ferrandez

Dates with ECI: 1978 - 1979

Current Position/Title: Teacher, SMH classroom

Thesis Title: The Development of Quantitative Procedures to Measure Visual Scanning in Handicapped and Nonhandicapped Individuals

Student Name: B. Humphrey

Dates with ECI: 1979 - 1980

Current Position/Title: Teacher, SMH classroom

Thesis Title: Quantitative Assessment of Visual Tracking Skills Among Severely Handicapped and Nonhandicapped Infants and Children

Student Name: T. Collier

Dates with ECI: 1979 - 1980

Current Position/Title: OT Consultant to classroom teachers

Thesis Title: Measuring Head Erect in Deaf-Blind Multihandicapped Children

Student Name: S. Komisar

Dates with ECI: 1978 - 1979

Current Position/Title: not currently employed (traveling in Europe)

Thesis Title: Quantitative Assessment of Visual Tracking Skills Among Severely Handicapped and Nonhandicapped Infants and Children: A Replication Study

Student Name: C. Mears

Dates with ECI: 1979 - 1980

Current Position/Title: Teacher, SMH classroom

Thesis Title: Quantitative Procedures to Measure Grasp Behavior in One Nonhandicapped Infant and Three Multiply Handicapped Preschoolers

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: S. Courte

Dates with ECI: 1980 - 1981

Current Position/Title: recently moved to Ann Arbor, Michigan

Thesis Title: A Replication of a Quantitative Assessment Procedure for Measurement of Release Behaviors in One Nonhandicapped and Three Handicapped Children

Student Name: A. Cronan

Dates with ECI: 1980-1981

Current Position/Title: Director, Preschool for Severely Multiply Handicapped Children

Thesis Title: The Development of Quantitative Measurement Procedures to Measure the Fine Motor Skill, Release, in Severely Multiply Handicapped Children

Student Name: K. Foshage

Dates with ECI: 1977 - 1978

Current Position/Title: Instructor, University of Kansas

Thesis Title: The Development of Quantitative Measurement Procedures to Measure Head Erect Behavior in Handicapped and Nonhandicapped Infants and Children

Student Name: T. Neese

Dates with ECI: 1980 - 1981

Current Position/Title: OT Consultant to classroom teachers

Thesis Title: The Development of Quantitative Procedures to Measure Grasp Behavior in One Nonhandicapped Infant and Five Handicapped Children

Student Name: M. Cisco

Dates with ECI: 1980 - 1981

Current Position/Title: Teacher, SMH classroom

Thesis Title: Quantitative Measurement of Transfer Skills in Handicapped and Nonhandicapped Preschoolers: A Replication Study

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: E. Luddy

Dates with ECI: 1980 - 1981

Current Position/Title: Teacher, SMH classroom

Thesis Title: The Development of Quantitative Procedures to Measure Standing and Sitting Behaviors Among Handicapped and Nonhandicapped Infants and Children

Student Name: P. Riggs

Dates with ECI: 1980

Current Position/Title: Teacher, SMH classroom

Thesis Title: Quantitative Assessment of Visual Fixation Skills Among Severely Handicapped and Nonhandicapped Infants and Children: A Replication Study

Student Name: M. Shepard

Dates with ECI: 1980 - 1981

Current Position/Title: Teacher, SMH classroom

Thesis Title: The Development of Quantitative Procedures to Measure Standing and Walking Behaviors Among Handicapped and Nonhandicapped Infants and Children

Student Name: T. Foss

Dates with ECI: 1980 - 1981

Current Position/Title: Teacher, SMH classroom

Thesis Title: Quantitative Assessment of Walking Behavior Among Severely Handicapped and Nonhandicapped Infants and Children: A Replication Study

Student Name: K. Thompson

Dates with ECI: 1980 - 1981

Current Position/Title: PT Consultant to classroom teachers

Thesis Title: Quantitative Measurement of Sitting Behavior in Children

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: J. Fritshall

Dates with ECI: 1979 - 1982

Current Position/Title: Director of OT, Truman East

Thesis Title: Quantitative Assessment of Rolling Behavior Among Severely Handicapped and Nonhandicapped Infants and Children: A Replication Study

Student Name: J. Dolloway

Dates with ECI: 1979 - 1980

Current Position/Title: PT Consultant to classroom teachers

Thesis Title: The Effects of Angular Stimulation on the Acquisition of Head Control in Multiply Handicapped Children

Student Name: L. Vogt

Dates with ECI: 1980 - 1982

Current Position/Title: Teacher, SMH classroom

Thesis Title: Quantative Assessment of Visual Scanning Among Severely Handicapped and Nonhandicapped Infants and Children: A Replication Study

Student Name: J. Cutsinger

Dates with ECI: 1980 - 1982

Current Position/Title: Education Program Specialist, Kansas SRS

Thesis Title: Quantitative Assessment of Reach Behavior Among Severely Handicapped and Nonhandicapped Infants and Children: A Replication Study

Student Name: D. Galvin-Cook

Dates with ECI: 1981 - 1982

Current Position/Title: Masters student, Special Education

Dissertation/Thesis Title: Measuring the Effects of Vestibular Stimulation on Head Erect and Vocalization Behaviors Among Severely/Multiply Handicapped Preschool Children (Thesis )

INVESTIGATOR: DOUG GUESS, JANE RUES, & STEVE WARREN (cont.)

Student Name: T. Cornell

Dates with ECI: 1981 - 1982

Current Position/Title: OT Consultant, public schools

Dissertation/Thesis Title: The Development of a Functional Assessment for the Quantitative Measurement of Reach, Group, Release, and Transfer Skills (Thesis?)

Student Name: Mary Hilboldt

Dates with ECI: 1981 - 1982

Current Position/Title: Director of OT, Regional Diagnostic Center

Dissertation/Thesis Title: Quantitative Assessment of Sitting Behavior: A Revision of Measurement Procedures (Thesis?)

INVESTIGATOR: FRANCES HOROWITZ

Student Name: Joseph Byrne

Dates with ECI: 6/1978 - 2/1982

Current Position/Title: Developmental Psychologist (60% clinical; 40% research)
Izaak Walton Killam Hospital for Children

Dissertation/Thesis Title: Discrimination of Object Shape in Motion (Dissertation)

Student Name: Vickie Czernicki

Dates with ECI: 1/1978 - 6/1980

Current Position/Title: Student

Dissertation/Thesis Title: None

Student Name: Edwin Gaddis

Dates with ECI: 6/1978 - present

Current Position/Title: Graduate student

Dissertation/Thesis Title: Adult Directed vs. Infant Directed Speech in Four-Month-Old Infants (Thesis)

INVESTIGATOR: FRANCES HOROWITZ (cont.)

Student Name: Virginia Ganz

Dates with ECI: 6/1979 - 5/1980

Current Position/Title: Graduate student

Dissertation/Thesis Title:

Student Name: Charles Nelson

Dates with ECI: 2/1979 - 3/1980

Current Position/Title: NIH Post-Doctoral Fellow, Institute of Child Development, University of Minnesota

Dissertation/Thesis Title: Perception of Holographically Presented Faces by Two- and Five-Month-Old Infants (Dissertation)

Student Name: Cynthia Ryan

Dates with ECI: 7/1976 - 7/1978

Current Position/Title: Graduate student

Dissertation/Thesis Title: Working on M.A. - no thesis yet

Student Name: Christopher Smith

Dates with ECI: 5/1980 - 4/1981

Current Position/Title: Masters level clinical psychologist, Pittsburgh, Kansas

Dissertation/Thesis Title:

Student Name: Susan Stachowiak

Dates with ECI: 9/1979 - 12/1983

Current Position/Title: Student

Dissertation/Thesis Title:

INVESTIGATOR: FRANCES HOROWITZ (cont.)

Student Name: Joseph Sullivan

Dates with ECI: 6/1978 - 4/1980

Current Position/Title: Investigator, University of Colorado Health Sciences Center

Dissertation/Thesis Title: The Effects of Intonation on Infant Attention (Dissertation)

Student Name: Michael Williams

Dates with ECI: 8/1980 - present

Current Position/Title: Graduate student

Dissertation/Thesis Title: A Six-Month Analysis of Mother Infant Interaction (Thesis)

INVESTIGATOR: JUDITH LEBLANC

Student Name: Debra Baxter

Dates with ECI: 8/79 - 8/80

Current Position/Title: Teacher on Indian Researvation

Dissertation/Thesis Title: The Relationship of Teacher Behaviors to a Child's Attending and Task-Related Behaviors in a Preschool Academic Group (Thesis)

Student Name: Karen Britten

Dates with ECI: 5/79 - 7/80

Current Position/Title: Research Assistant

Dissertation/Thesis Title: A Comparison of Massed and Intermixed Stimulus Presentations in Visual Discriminations of Normal and Learning Disabled Children (Thesis)

Student Name: John Drake

Dates with ECI: 8/78 - 6/80

Current Position/Title: Teaching Assistant & Behavior Therapist

Dissertation/Thesis Title: (Dissertation)

INVESTIGATOR: JUDITH LEBLANC (cont.)

Student Name: Deborah Goldstein

Dates with ECI: 7/77 - 6/78

Current Position/Title:

Dissertation/Thesis Title: The Effect of Paced Instructions, Reprimands and Physical Guidance on Compliance (Thesis)

Student Name: Sandra Hass

Dates with ECI: 7/78 - 12/78

Current Position/Title: Teaching Practicum

Dissertation/Thesis Title: Detailed and Minimal Instructions: The Effects Criterion-Related Instructions on Children's Discrimination Acquisition (Thesis)

Student Name: Shirley Kramer

Dates with ECI: 7/81 - 6/82

Current Position/Title: Research Assistant

Dissertation/Thesis Title: Facilitating Children's Observational Learning During Group Teaching

Student Name: Rebecca Fallows MacDonald

Dates with ECI: 5/79 - 12/81

Current Position/Title: Research Assistant, Kansas Neurological Institute

Dissertation/Thesis Title: Stimulus Equivalence and Observational Learning in Teaching Concepts to Preschool Children

Student Name: Ted R. Ruggles

Dates with ECI: 4/79 - 12/81

Current Position/Title: Psychologist, Sonoma State Hospital, Sonoma, CA

Dissertation/Thesis Title: Postdoctoral Trainee -- Research in observational learning and stimulus equivalency

INVESTIGATOR: NANCY PETERSON

Student Name: Joe Blackbourn

Dates with ECI: 9/78 - 8/80

Current Position/Title: Faculty member - Mississippi Women's College
Columbus, Miss.

Dissertation/Thesis Title: not completed

Student Name: Patricia Barber

Dates with ECI: 6/81 - 6/82

Current Position/Title: Research trainee, ECI

Dissertation/Thesis Title: The comparison of the Noncompliant Behaviors of Young Handicapped and Nonhandicapped Children

Student Name: Elsa C. Callen

Dates with ECI: 6/79 - 6/80

Current Position/Title: Coordinator of Early Intervention Program, Topeka School District, Topeka

Dissertation/Thesis Title: Training Handicapped Preschoolers to Draw the Human Figure (Thesis)

Student Name: Judy Carta

Dates with ECI: Not employed by ECI

Current Position/Title: Teacher - High-Risk Preschool Intervention Program, University of Kansas Med. Center, Kansas City, KS

Dissertation/Thesis Title: An Investigation of the Object Play of Handicapped and Nonhandicapped Preschoolers (Dissertation)

Student Name: C. Cooper

Dates with ECI: 8/81 - 6/82

Current Position/Title: Research trainee - Early Childhood Institute

Dissertation/Thesis Title: Social Integration of Handicapped and Nonhandicapped Preschoolers: A Study of Parents Perceptions and Attitudes (Thesis)

INVESTIGATOR: NANCY PETERSON (cont.)

Student Name: Patricia Fladung

Dates with ECI: Not employed by ECI

Current Position/Title: Special Education Teacher, Kansas City, MO

Dissertation/Thesis Title: Certification for Teachers of Handicapped Children Under Regular School-Age (Theses)

Student Name: L. Mallonee

Dates with ECI: 1/80 - 6/80

Current Position/Title: Coordinator of Early Intervention Program, Maine

Dissertation/Thesis Title: Emerging Attitudes of Preschoolers Toward the Disabled as Measured in Simulated Play Situations (Thesis)

Student Name: G. Long *

Dates with ECI: 8/79 - present

Current Position/Title: School Psychologist, Olathe, Kansas

Dissertation/Thesis Title: A Descriptive Analyses of Unstructured Social Interactions and Free Play Behavior of Handicapped and Nonhandicapped Preschoolers (Dissertation)

Student Name: J. Mantle

Dates with ECI: 6/79 - 6/80

Current Position/Title: Faculty member, Dept. of Special Ed., Central Missouri State University, Warrensburg, MO

Dissertation/Thesis Title: A Comparison Between Teacher and Primary Care-Taker Ratings of Handicapped and Nonhandicapped Preschoolers on Two Assessment Tools (Dissertation)

Student Name: J. McNally

Datew with ECI: Not employed by ECI

Current Position/Title: Faculty member, Dept. of Special Ed., Boston University, Boston, MA

Dissertation/Thesis Title: An Investigation of the Level of Informed Consent Being Rendered Under P.L. 94-142 on Behalf of Handicapped Children in Foster Care (Dissertation)

INVESTIGATOR: NANCY PETERSON (cont.)

Student Name: J. North

Dates with ECI: Not employed by ECI

Current Position/Title: Teacher, Early Intervention Preschool, Kansas City, MO

Dissertation/Thesis Title: Parents of Nonhandicapped Preschoolers Look at Mainstreaming: A Study of Their Attitudes and Perceptions (Thesis)

Student Name: Michael Rettig

Dates with ECI: 7/79 - 6/82

Current Position/Title: Research trainee, ECI

Dissertation/Thesis Title: An Investigation of the Spontaneous Social and Play Interactions of Down's Syndrome and Nonhandicapped Preschool Children in a Free Play Setting (Thesis)

An Investigation of Computer Assisted vs. Teacher Assisted Instruction on the Acquisition of Pre-Academic Skills by Mentally Retarded Preschool Children (Dissertation)

Student Name: J. Shaw

Dates with ECI: Not employed by ECI

Current Position/Title: Teacher of EMR children, Kansas City, MO

Dissertation/Thesis Title: A Study of the Attitudes of Regular Elementary Classroom Teachers Toward Mainstreaming and the EMR Child (Thesis)

Student Name: K. Sullivan

Dates with ECI: Not employed by ECI

Current Position/Title: Faculty member, University of Denver, Denver, CO

Dissertation/Thesis Title: The Relationship of Three Developmental Checklists in Evaluating Handicapped Head Start Children (Dissertation)

Student Name: B. Thompson

Dates with ECI: Not employed by ECI

Current Position/Title: Faculty member, Baker University, Baldwin, KS

Dissertation/Thesis Title: An Investigation and Comparison of Special Education Administrators and Teacher Perceived Quality of District Implementation Procedures for P.L. 94-142 (Dissertation)

INVESTIGATOR: ANN ROGERS-WARREN

Student Name: Cathy Alpert

Dates with ECI: 2/79 - 6/82

Current Position/Title: Graduate Student, Human Development & Family Life, KU

Dissertation/Thesis Title: Training Parents to be Incidental Teachers of Their Language Learning Children (Dissertation)

Student Name: Fredda Brown

Dates with ECI: 7/79 - 6/80

Current Position/Title: Assistant Professor, Dept. of Special Ed., Virginia Commonwealth Univ.

Dissertation/Thesis Title: The Effect of Systematic Peer Interaction in a Group Setting on the Incidental Learning of Two Severely Handicapped Students (Dissertation)

Student Name: John Anderson

Dates with ECI: 9/80 - 6/82

Current Position/Title: Graduate Student, Clinical Psych., Univ. of Kansas

Dissertation/Thesis Title: Visual Evoked Responses of Familial and Non-familial Dyslexics, Their Normally Reading Family Members, and Normally Reading Controls

Student Name: Steven Dubrofsky

Dates with ECI: 1/80 - 8/80

Current Position/Title: Graduate Student, Administrative Foundations in Higher Education, Univ. of Kansas

Dissertation/Thesis Title: (Thesis)

Student Name: Joni Maxwell

Dates with ECI: 7/80 - 8/82

Current Position/Title: Graduate Student, Human Development & Family Life, Univ. of Kansas

Dissertation/Thesis Title: (Thesis)

INVESTIGATOR: ANN ROGERS-WARREN

Student Name: Ralph J. McQuarter

Dates with ECI: 7/78 - 6/80

Current Position/Title: Teacher of autistic children, Minneapolis Public Schools

Dissertation/Thesis Title: The Mand-Model Technique: An Alternative to Traditional Speech Therapy (Thesis)

Student Name: Louise Merolla Neilsen

Dates with ECI: 6/80 - 12/81

Current Position/Title: Graduate Student, Human Development & Family Life, Univ. of Kansas

Dissertation/Thesis Title: Mothers Strategies for Eliciting Verbalizations from Their Children (Thesis)

INVESTIGATOR: TRUDYLEE ROWBURY/DONALD BAER

Student Name: Rita Curl

Dates with ECI: 9/78 - 12/82

Current Position/Title: Director of Dissemination, Educational Systems Associates, Lawrence, KS

Dissertation/Thesis Title: Cuing Procedures for Social Interaction (Thesis)

Picture Cards as a Simple Technique for Facilitating Peer Interaction in Young Learning Delayed Children (Dissertation)

Student Name: Dan Dugan

Dates with ECI: 9/78 - present

Current Position/Title: Ph.D. student trainee, HDFL

Dissertation/Thesis Title: Compliance Training in Young Oppositional Children (Thesis)

(Dissertation in progress)

Student Name: Vaughn Hathaway *

Dates with ECI: 1/80 - 7/81

525

Current Position/Title: Ph.D. student, University of New Hampshire

Dissertation/Thesis Title: A Training Procedure to Teach Self-Monitoring to a Young Learning Delayed Boy

INVESTIGATOR: TRUDYLEE ROWBURY/DONALD BAER

Student Name: Trish Leidholt

Dates with ECI: 9/81 - 6/82

Current Position/Title: Staff Trainer, May Institute for Autistic Children

Dissertation/Thesis Title: Generalization of Group Participation Skills Following Brief Training

Student Name: Sue Parker

Dates with ECI:

Current Position/Title: Director of a hospital day care facility in St. Louis

Dissertation/Thesis Title: The Relation of Mastery and Preference in Young Children

Student Name: Lisa Smith *

Dates with ECI:

Current Position/Title:

Dissertation/Thesis Title: Ecological Analysis of Preschool and Kindergarten Classroom Formats (Thesis)

Student Name: Janet Wedel

Dates with ECI:

Current Position/Title: Project Coordinator, Lawrence Early Education Project

Dissertation/Thesis Title: Parent Involvement in Learning through Reading with their Children (Thesis)

# CHAPTER VII ORGANIZATION AND PERSONNEL

Philosophy: Basic to the management philosophy was the commitment to maintain the focus of the Institute on research in Early Childhood Education of the Handicapped. A secondary but important commitment was to provide training experience in research procedures to selected graduate students.

The philosophy is best described as one which reflects coordination of efforts by member researchers rather than the specification of rules by which members must operate. Inherent in this statement are several implications. These include:

(a) maximum involvement of researchers in decision making;
(b) a staff investment in coordination;
(c) minimizing the setting of bureaucratic procedures;
(d) structuring an efficient communication system among researchers;
(e) clear commitments on the part of researchers to the mission of the Institute.

The management plan described in this section was simple and flexible. It succeeded because of the experience of senior researchers in prior programmatic research activities and because of the history of the University of Kansas in operating large scale programmatic research programs. The Institute is an official research institute approved by the Board of Regents and subject to close monitoring by the office of the Vice Chancellor for Research Administration and Graduate Studies. Internal accountability measures are built into the management plan through standing committees with prescribed functions and clearly stated job descriptions for the Institute staff.

Objectives: The objectives for the management structure were to create a vehicle that would:

(1) allow a coordinated and integrated research effort in early childhood education for the handicapped to emerge,
(2) provide senior and promising young researchers an opportunity to pursue joint service and research endeavors and to integrate such service and research in their teaching missions; and
(3) create a research climate conducive to the development of an integrated program of research that would serve as a model for an institute committed to research, development, education, and training in the field of the young handicapped child.

Organizational Structure: The Institute involved faculty members and support staff from the two departments but administratively functioned as an independent unit responsible to the Office of the Vice Chancellor for Research and Graduate Studies. Faculty members participating in the Institute as researchers retained their academic appointments in the College or School. Joint academic Research Scientists' appointments were provided for those individuals whose Institute responsibility necessitated academic

RESEARCH COORDINATION STRUCTURE

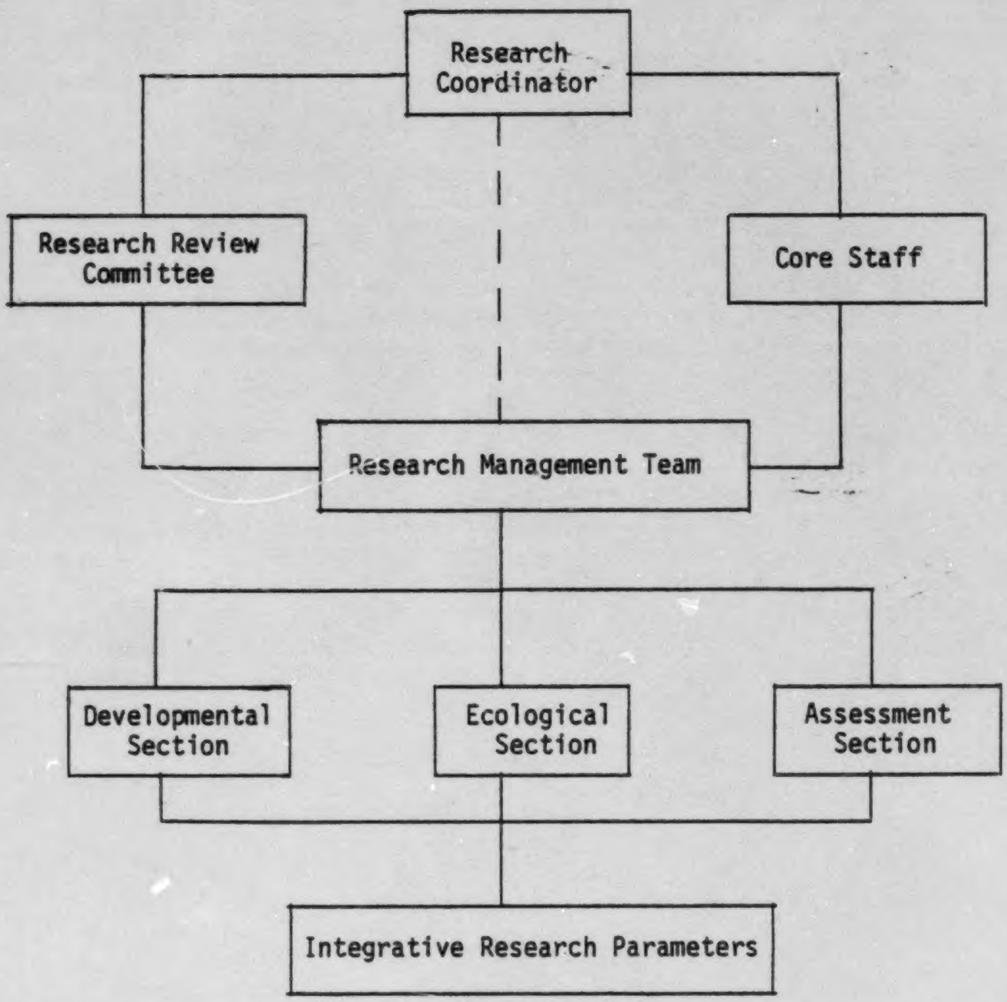

Research Coordinator
Research Review Committee
Core Staff
Research Management Team
Developmental Section
Ecological Section
Assessment Section
Integrative Research Parameters

FIGURE 84

participation in both Departments. Researchers from other academic departments and research units in the University hold research appointments in the Institute, and when appropriate, joint appointments in the participating departments. Figure depicts the overall research coordination structure.

A schematic representation of the primary components of the management plan is shown in Figure 85. Although the model is drawn in such a way to imply a hierarchial structure, this structure is not a rigid one. The research coordinator, associate coordinator, and other members of the core staff communicated directly with investigators, and with the various committees as the need arose. Because the principal investigators, the research coordinator, associate research coordinator, and assistant coordinator, as well as members of the review committee all engaged in research, the emphasis on research participation was maintained throughout the administrative structure. Thus, the interests of researchers were represented in all administrative decisions. The research coordinator was the primary channel of communication between the Institute and the University and the Bureau of Education for the Handicapped.

Decision Making: Decision-making within the Institute occurred in an atmosphere which supported communication and constructive feedback. Certain individuals and committees had the responsibility for each decision; however, a concerted effort is made to ensure that all concerned were kept informed and felt free to provide feedback to those making decisions. General guidelines for decision-making and staff responsibility are given below. Job descriptions for core staff and information on the roles of major committees follow.

General Institute policy decisions were made by the Institute members with the principal investigators and core staff offering alternatives for the group's consideration. Policy was implemented by the principal investigators and research coordinator.

Day-to-day procedures and policies were made by the research cocoordinator in consultation with the principal investigators. These policies and decisions were carried out by the core staff. Such procedures included: approving the spending of the core money (funds not designated to research studies), supervision for core staff, and specification of procedures for use of Institute resources (equipment, supplies, etc.).

Research decisions originated with individual investigators within structured guidelines determined by research membership. The function of the Review Committee was to offer helpful criticism on research proposals and approve affiliation of other external and internal research grants. The National Advisory Committee also provided review of research proposals and consultation on on-going research.

Budgetary decisions were made by the principal investigators in consultation with the research coordinator and individual investigators. Individual investigators assumed responsibility for personnel funded by their projects. Clerical staff were supervised by the core staff.

MANAGEMENT STRUCTURE

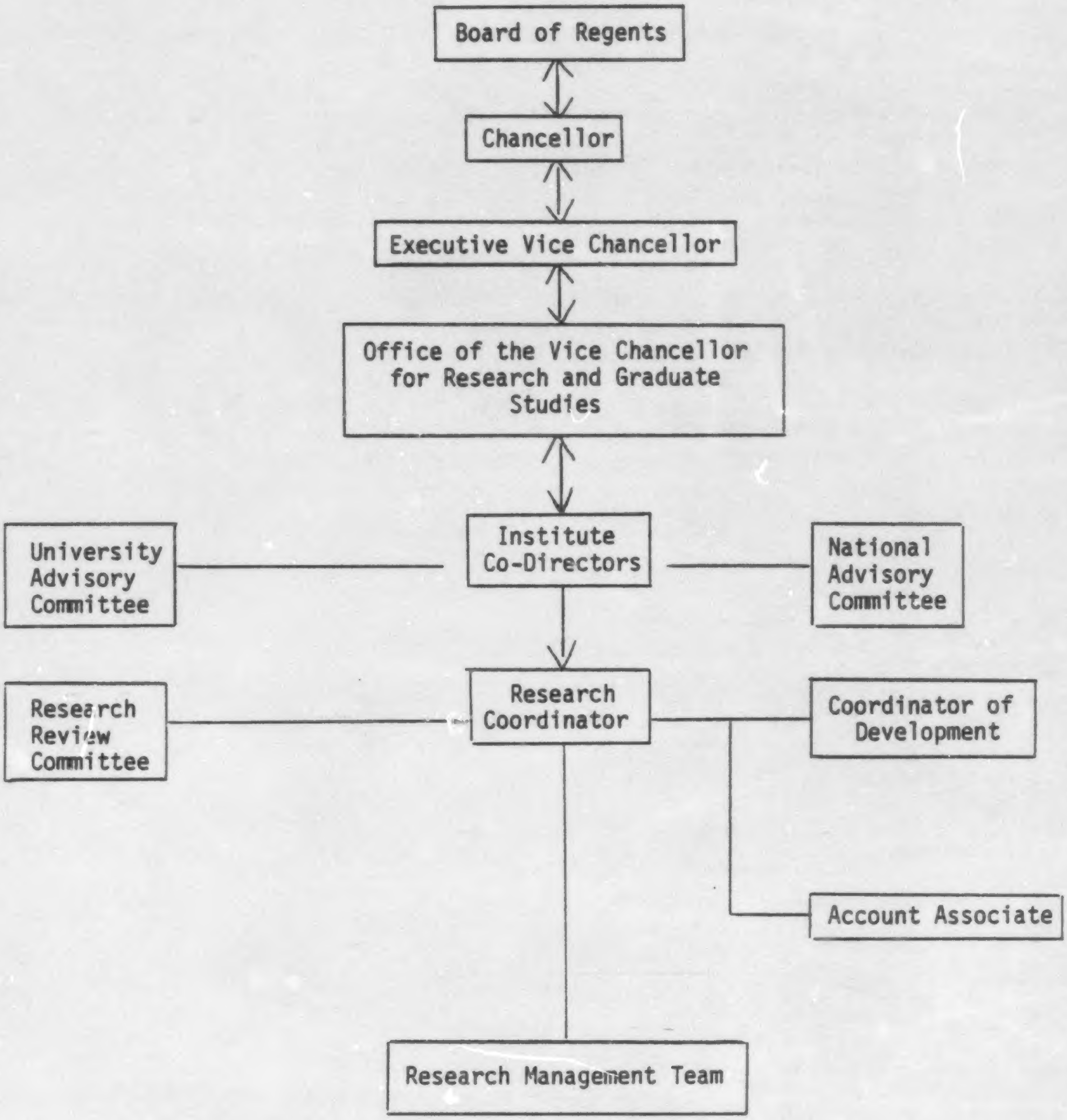

Board of Regents
Chancellor
Executive Vice Chancellor
Office of the Vice Chancellor for Research and Graduate Studies
University Advisory Committee
Institute Co-Directors
National Advisory Committee
Research Review Committee
Research Coordinator
Coordinator of Development
Account Associate
Research Management Team

FIGURE 85

Specific responsibilities of core staff members and committees: The Office of the Vice Chancellor for Research and Public Services has as one of its duties the administrative responsibility for all research activities within the University. The Vice Chancellor in this office (Frances Degen Horowitz) reports directly to the Executive Vice Chancellor and is part of the central academic administrative core. The Co-Directors of the Institute were responsible to the Vice Chancellor for Research and Graduate studies. All policy decisions pertaining to the management of fiscal resources, personnel, appointments, and contractural agreements were established in accordance with procedures set forth by this office within the laws of the State of Kansas.

Co-Directors: The Co-Directors were Judith M. LeBlanc, Co-Chairperson and Professor of Human Development, and Edward L. Meyen, Professor of Special Education and Associate Vice Chancellor for Research and Public Services. The Co-Directors were responsible to the Vice Chancellor for Research and Graduate Studies. Their primary functions were as follows:

(1) to represent and be responsible for the Institute to the University;
(2) to represent the Institute staff by providing the University and the National Advisory Committees information on Institute activities and the setting of policies and/or guidelines;
(3) to define roles, establish operational procedures, recruit and help select major personnel;
(4) to set procedures for monitoring fiscal and program activities and to assure compliance with funding guidelines of both the University and the national funding agencies;
(5) to represent the Institute with the Office of Research Administration in negotiations with the funding agencies;
(6) to serve as a primary source of information for the Research Director on University policy and guidelines suggested by the University Advisory Committee;
(7) to assure compliance with the terms and conditions of the funding agencies and the policies of the University.

University Advisory Committee: Because the Institute was a University wide unit with research activities based on the main campus at Lawrence and the University of Kansas Medical Center in Kansas City, Kansas, a University Advisory Committee comprised of administrators with research, academic, and administrative responsibilities was appointed. This committee was perceived as a significant unit with its members committed to the purposes of the Institute in relation to their respective administrative responsibilities. The committee consisted of:

Frances Degen Horowitz, Vice Chancellor for Research and Graduate Studies, and Dean of the Graduate School

Robert Cobb, Dean, College of Liberal Arts and Sciences

David Waxman, M.D., Executive Vice Chancellor, University of Kansas Medical Center

Dale Scannel, Dean, School of Education

Richard Schiefelbusch, Director, Bureau of Child Research

The University Advisory Committee had four primary functions:

(1) to guide the overall operation of the Institute between budgetary units within the University and when appropriate to represent the Institute to the Chancellor, Regents, and citizens of the State of Kansas;
(2) to serve as the primary source of direction to the Institute on issues related to the utilization of University resources, for example, space, computer resources, access to other units, appointments, etc.;
(3) to represent the Institute to others outside the University where services requiring the expertise of the Institute are needed;
(4) to provide counsel to the Institute staff on issues related to the organization and to University relationships.

National Advisory Committee: Individuals known for their expertise in research, early childhood, handicapped conditions, and other areas specific to the research focus of the Institute were selected for membership. The following persons served on the committee:

Sidney W. Bijou
Norris Haring
John N. Meier
Phillip Morris
Edward P. Willems

The duties of the National Advisory Committee were both informational and advisory in areas of:

(1) ongoing research in other settings which are applicable to activities of the Institute;
(2) national and international professional service and research activities in early childhood, special education, and related fields;
(3) other research which would benefit local investigators in the research thrust selected by the Institute;
(4) specific projects and the selection of relevant consultants;
(5) meetings with the Research Development Committee regarding the general direction of the Institute.

Research Review Committee: (Chairperson, Donald M. Baer, Distinguished Professor of Human Development and Psychology). This committee was comprised of two groups: three faculty investigators from the Institute's core research group and three researchers from the greater University research population.

The six members of the Research Review Committee, in addition to Donald M. Baer were:

Members External to Institute: James Sherman, Human Development
Edward Wike, Psychology
Mary Ross Moran, Special Education

Members who were Investigators With the Institute: Nancy Peterson
Barbara Etzel
Doug Guess

The chairperson was selected by the Institute Co-Directors responsible for the grant upon recommendation from the core group of investigators. The Co-Directors and the Research Coordinator attended the Research Development Committee meetings in an ad hoc capacity. The committee had four primary functions:

(1) to review each research project and make recommendations for improving the research;
(2) to improve quality control regarding the determination of new research activities to be undertaken by the Institute;
(3) to monitor the research focus of the Institute;
(4) to advise on affiliations with research projects within the University and external to the University.

Core Staff: The staffing pattern of the Institute placed primary emphasis on research projects. The core staff primarily served coordination and support functions. The intent was to establish a highly integrated research system with functional administrative structure.

Research Coordinator (.83 FTE): The Research Coordinator, Ann Rogers-Warren, was responsible for the daily management of the Institute in cooperation with the Principal Investigators, and was involved in:

(1) day-to-day coordination of the Institute;
(2) participation in policymaking decisions;
(3) supervision, with the Coordinator of Development, of the core staff and clerical staff;
(4) coordination of activities involving individuals from other Institutes;
(5) supervising and organizing the preparation of progress reports and renewal applications;
(6) communication with external agencies;
(7) communication with the Principal Investigators;
(8) overall responsibility for operation of the grant.

Coordinator of Development (1.0 FTE): Coordinator of Development, Sidney Roedel, was responsible to the Research Coordinator and was involved in:

(1) the development and coordination of a system for disseminating the products and knowledge produced by the Institute;

(2) the coordination of field-testing activities;
(3) with the Research Coordinator, assisting in inter-Institute activities;
(4) Periodically, assisting in updating literature references;
(5) supervision of clerical staff and providing general administrative support;
(6) other activities at the direction of the Research Coordinator.

Account Associate (.5 FTE): Jan O'Neill was responsible to the Research Coordinator and the Institute Co-Directors. The Account Associate's duties included:

(1) monitoring all regular budgetary activities;
(2) purchasing;
(3) personnel processing;
(4) accounting.

The Account Associate worked with the Institute Co-Directors and the Research Coordinator in assuring that the Institute adhered to monetary policies set forth by the University and the Bureau for the Education of the Handicapped.

Project Investigators: (K. Eileen Allen, Donald M. Baer, Alita Y. Cooper, Barbara C. Etzel, Lynne H. Embry, Carol Foster, P. Douglas Guess, Frances D. Horowitz, Judith M. LeBlanc, Nancy L. Peterson, Ann Rogers-Warren, and Trudylee Rowbury).

An investigator with the Kansas Research Institute assumed responsibility for the planning and implementation of a series of programmatic studies focusing on an area of investigation designed in the original application or subsequent continuation application. Investigators were responsible for planning research, monitoring ongoing research and offering day-to-day guidance and input to the persons actually conducting the research, supervising of any staff and trainees designated as assistants for their projects, participating in regular Institute meetings, contributing to progress reports and renewal applications, and serving as cooperating members of the Institute research staff.

## INSTITUTE PERSONNEL

### Core Staff:

LeBlanc, Judith - Primary Investigator
Meyen, Ed - Primary Investigator
Rogers-Warren, Ann - Research Coordinator
Roedel, Sidney - Coordinator of Development
O'Neill, Jan - Accountant
Huslig, Montana - Secretary
Freeseman, Carrie - Dissemination Assistant (hourly)
Young, Sue - Observation Coordinator
Harkness, Jerry - Media Coordinator

### Investigators:

Allen, Eileen
Baer, Don
Cooper, Alita
Embry, Lynne
Etzel, Barbara
Foster, Carol
Guess, Doug
Horowitz, Frances
LeBlanc, Judith
Meyen, Ed
Peterson, Nancy
Rogers-Warren, Ann
Rowbury, Trudi

### Research Associates:

Aangeenbrug, Mimi
Fowler, Susan
Rues, Jane
Warren, Steven

### National Advisory Board:

Bijou, Sidney
Haring, Norris
Meier, John
Morse, Phillip
Willems, Edwin

# CHAPTER VIII IMPACT OF THE INSTITUTE

The Kansas Early Childhood Institute has had considerable impact on a number of audiences, including researchers, practitioners, parents, policymakers, and students. Although it is often difficult to judge the long term impact of a major project immediately after the project is completed, investigators in the Institute were asked to indicate (1) the audiences they had addressed as a result of work supported by the Institute, and (2) what they considered to be the most important effects of the Institute. The following is a summary of data and comments collected from the thirteen senior investigators associated with the Early Childhood Institute.

## Support for Research.

ECI investigators concurred that the most important impact of the support provided during the last five years is in the area of research. Funds provided through the Institute permitted investigators to (1) complete a number of major studies describing the behavioral differences in normal and handicapped or at-risk children, (2) develop a wide range of interventions and to experimentally test and refine them, and (3) pilot efforts into previously unresearched areas. The breadth of these efforts and the extent of data collection and analysis that was possible is unequalled in University of Kansas' long history of research with children. This research effort represents a substantial scientific contribution in the area of early childhood education of the handicapped, and, we believe, its impact will be felt for years to come as additional institute research findings are published.

## Recognition for ECI Efforts.

Work funded through the Institute has already resulted in widespread recognition for many individual researchers and for the Institute. ECI investigators have been invited to participate in numerous national and international conferences, to contribute to a large number of books and journals, to serve on editorial boards and grant review panels, and to offer consultation in intervention programs.

## Impact on Service Providers, Researchers, and Other Audiences.

Personal efforts of ECI personnel have resulted in contact with a wide range of audiences. Table lists the particular audiences reached by ECI investigators and the approximate number of people in each audience. The number of different professions, the considerable international audience, and the extent of ECI efforts to address the general public, together suggest the breadth of the Institute's impact. The numbers in Table 37 include only audiences addressed in person or, in the case of the general public, via radio or television. Many of the presentations were in workshop format and included consultations with service providers. In addition, over 2,200 copies of Institute documents have been disseminated. The readerships of journals and books in which Institute research has been published are not included, but it may be assumed that the impact via print media has been substantial.

## Table 37

### Audiences Reached by the Kansas Early Childhood Institute

| | |
|---|---|
| Teachers | 5725 |
| Infant program personnel | 90 |
| Preschool | 910 |
| Preschool handicapped | 650 |
| Daycare | 200 |
| Primary grade regular and special education | 580 |
| Unspecified | 3385 |
| Parents | 1760 |
| Pediatricians and other health professionals (nurses, technicians, etc.) | 158 |
| Psychologists (in public schools and private practice) | 685 |
| Academic instructors and researchers (university and college instructors) | 1755 |
| Speech therapists and language training personnel | 760 |
| Occupational therapists | 260 |
| Physical therapists | 265 |
| Parent trainers and other family therapists | 321 |
| General public | 647,815 |
| University and college students | 3050 |
| International audiences | |
| Japan | 1000 |
| Germany | 70 |
| Venezuela | 200 |
| Mexico | 3600 |
| Australia | 260 |
| New Zealand | 150 |
| Dominican Republic | 250 |
| Sweden | 50 |
| England | 27 |
| Italy | 500 |
| Holland | 50 |
| Peru | 150 |
| Greece | 10 |
| Scotland | 50 |

## Impact on Children and Their Families.

The applied nature of a considerable portion of the Institute's research has directly affected children and their families. In the course of the Institute's work, children were trained in a variety of skills including social interaction, language, preacademics, reading, pedestrian behavior self-control, and instruction-following. Parents were trained as behavior managers and incidental teachers of their children. Teachers were trained to instruct children, to collect data, to interact with parents, to arrange environments to facilitate children's social interaction, and to interact more effectively with children. The assessments conducted by Institute researchers identified a large number of children who subsequently entered treatment programs. It seems especially important that Kansas Early Childhood Institute investigators not only tested and prescribed assessments and interventions for children and families, they also applied their techniques for the immediate benefits of these groups of people.

## The ECI Training Program.

Over 100 students received training in research methods with handicapped children through the efforts of the Institute. In addition to the daily research training, opportunities to meet with consultants, to attend workshops and conferences, and to acquire specialized skills in time management, computing, and technical writing were provided to trainees. The financial support provided through the Institute enabled many students to complete their education and to enter the field of special education much more quickly and with much more thorough training than would otherwise have been possible.

## Resource for Legislators and for the Community.

During the course of the Institute's activities, it has become (in large part through our extensive dissemination efforts) a resource for local, state, and national legislators and for practictioners in the surrounding community. During the consideration of legislation mandating preschool education for the handicapped in Kansas, ECI provided materials for the House and Senate education committees and investigators provided expert testimony in several related hearings. ECI provided materials documenting the effectiveness of early intervention to state representatives and senators during the recent national budget hearings. ECI frequently provides information for local media for community projects related to young children. We have also supported other research and demonstration projects by assisting in their dissemination efforts and by providing technical assistance.

## Summary.

The full impact of the Kansas Early Childhood Institute may not be realized for several years. However, the immediate and widespread positive effect of the activities undertaken has embraced scientific, service, and community audiences, and it has directly benefited investigators, trainees, children and their families.

## REFERENCES

Allen, G.J. Case study: Implementation of behavior modification techniques in summer camp settings. Behavior Therapy, 1973, 4, 570-575.

Allen, J.R. Testing visual acuity in preschool children: Norms, variables, and a new picture test. Pediatrics, 1957, 19, 1093-1100.

Allen, K.E., & Ruggles, T.R. The analysis of teacher-child interaction patterns in the preschool setting. In E.B. Edgar, N.G. Haring, J.R. Jenkins, & C.R. Pious (Eds.), Serving young handicapped children: Issues and research, in press.

Apolloni, T., Cooke, S.A., & Cooke, T.P. Establishing a normal peer as a behavioral model for developmentally delayed toddlers.

Auerswald, E.H. Interdisciplinary versus ecological approach. In W. Gray, F.J. Duhl, & D. Rizzo (Eds.), General systems theory and psychiatry. Boston: Little, Brown, & Co., 1969.

Axelrod, S., Hall, R.V., & Tams, A. Comparison of two common classroom seating arrangements. Academic Therapy, Sept. 1979.

Baer, D.M., Wolf, M.M., & Risley, T.R. Some current dimensions of applied behavior analysis. Journal of Applied Behavior Analysis, 1968, 1, 91-97.

Bandura, A. Vicarious and self-reinforcement processes. In R. Glaser (Ed.), The nature of reinforcement. New York: Academic Press, 1971.

Barker, [illegible] The stream of behavior as an empirical problem. In R.G. Barker (Ed.), The stream of behavior. New York: Meridith Publishing Co., 1963.

Barker, R.G. Ecological Psychology. Stanford, Calif.: Stanford University Press, 1968.

Barton, A., & Wilder, P. Research and practice in teaching of reading: A progress report. In M.B. Miles (Ed.), Innovation in education. New York: Bureau of Publication, Teachers College Columbia University, 1964.

Bates, E., Camaioni, L., & Volterra, V. The acquisition of performatives prior to speech. In E. Ochs & B. Schiefflin (Eds.), Developmental pragmatics. New York: Academic Press, 1979.

Bayley, N. Bayley scales of infant development. New York: The Psychological Corporation, 1969.

Bayley, N. Mental growth during the first three years: A developmental study of sixty-one children by repeated tests. Genetic Psychology Monographs, 1933, 14, 1-92.

Bijou, S.W. Child development: The basic stage of early childhood. New Jersey: Prentice-Hall, Inc., 1976.

Bond, G.L., & Dykstra, R. The cooperative research program in first-grade reading instruction. *Reading Research Quarterly*, 1967, 6, 5-11.

Boroughs, M.C. *The stimulation of verbal behavior in culturally disadvantaged three-year-olds*. Michigan State University, East Lansing, 1970. (ERIC Document Reproduction Service No. ED 013 371)

Bradley, R.H., & Caldwell, D.M. Home observation for measurement of the environment: A validation study of screening efficiency. *American Journal of Mental Deficiency*, 1977, *81*, 417-420.

Brazelton, T.B. Neonatal behavioral assessment scale. *National Spastics Society Monographs*. Philadelphia: J.B. Lippincott, 1973.

Brazelton, B., & Tronick, E. Preverbal communication between mothers and their infants. In D. Olson (Ed.), *The social foundations of language and thought*. New York: W.W. Norton and Company, 1980.

Bricker, D.D. A rationale for the integration of handicapped and nonhandicapped preschool children. In M.J. Guralnick (Ed.), *Early intervention and the integration of handicapped and nonhandicapped children*. Baltimore: University Park Press, 1978.

Busby, K.H., & LeBlanc, J.M. *Response latency as a function of reinforcement and temporal contingencies*. Paper presented at the 80th annual convention of the American Psychological Association, Honolulu, Hawaii, September 1972.

Camp, B.W., Van Doorninck, W.J., Frankenburg, W.K., & Lampe, J.M. Preschool development testing in prediction of school problems. *Clinical Pediatrics*, 1977, *16*, 257-163.

Campoine, J.C., & Brown, A.L. The role of contextual cues in mediating transfer. *Journal of Experimental Child Psychology*, 1973, *16*, 217-224.

Carden-Smith, L.K. *The classroom observation system: A method for assessing the classroom behavior of preschool and kindergarten children*. Unpublished master's thesis, University of Kansas, 1980.

Carnine, D. Effects of two teacher-presentation rates on off-task behavior, answering correctly, and participation. *Journal of Applied Behavior Analysis*, 1976, *9*, 199-206.

Carnine, D. & Silbert, J. *Direct instruction reading*. Columbus: Charles E. Merrill, 1979.

Carter, L.F. *Research and development: Its application to urban problems*. Santa Monica, Calif.: System Development Corporation, SP-3190, 1968.

Cattell, P. *The measurement of intelligence of infants and young children*. New York: The Psychological Corporation, 1940.

Chester, M.A., & Fox, R. Teacher-peer relations and educational change. *National Educational Association Journal*, 1967, *56*, 25-26.

Clark, D.L. The function of the United States Office of Education in the dissemination and implementation of educational research. In K. Goldhammer & S. Elam (Eds.), Dissemination and implementation: Third annual Phi Delta Kappa symposium of educational research. Bloomington, Ind.: Phi Delta Kappa, 1962.

Coe, R.M., & Bernhill, E.A. Social dimensions of failure in innovation. Human Organization, 1967, 26, 149-156.

Cohen, M., Gross, P., & Haring, N.G. Developmental pinpoints. In N. Haring & L. Brown (Eds.), Teaching the severely handicapped: A yearly publication of the American Association for the Education of the Severely/Profoundly Handicapped (Vol. 1). New York: Stratton, 1976.

Costello, T.W., & Zalkind, S.S. Psychology in administration. Engelwood Cliffs, N.J.: Prentice-Hall, 1963.

Covill, J.L., & Etzel, B.C. Effects of errorless learning on problem-solving skills. Paper presented at the 84th annual convention of the American Psychological Association, Washington, D.C., 1976.

Crane, D. The nature of scientific communication and influence. International Social Science Journal, 1970, 1, 28-41.

Cress, P.J. Development of subjective visual acuity assessment procedures for severely handicapped persons. Unpublished Master's Thesis, University of Kansas, 1980.

Cress, P.J., Spellman, C.R., DeBriere, T.J., Sizemore, A.C., Northam, J.K., & Johnson, J.L. Vision screening for persons with severe handicaps. Journal of the Association for the Severely Handicapped, 1981, 6, 41-50.

Croker, G.W, Some principles regarding the utilization of social science research within the military. In Case studies in bringing behavioral science into use: Studies in the utilization of behavioral science (Vol. 1). Stanford, Calif.: Institute for Communication Research, Stanford University, 1961.

Cronback, L.J. Essentials of psychological testing (3rd ed.). New York: Harper & Row Publishers, 1970.

Dahling, L.J. Shannon's information theory: The spread of an idea. In Studies of innovation and of communication to the public: Studies in the utilization of behavioral sciences (Vol. 2). Stanford, Calif,: Institute for Communication Research, Stanford University, 1962.

Devoney, C., Guralnick, M.J., & Rubin, H. Integrating handicapped and nonhandicapped preschool children: Effects on social play. Childhood Education, 1974, 50, 360-364.

Dorry, G.W., & Zeaman, D. Teaching a simple reading vocabulary to retarded children: Effectiveness of fading and non-fading procedures. American Journal of Mental Deficiency, 1975, 6, 711-716.

Elardo, R., Bradley, R., & Caldwell, B. The relation of infants' home environments to mental test performance from six to thirty-six months: A longitudinal analysis. *Child Development*, 1975, *46*, 71-76.

Embry, D.D., & Malfetti, J. *The effects of storybooks on preschoolers' out-door play, or "Never put your feet in the street...."* (ECI Document No. 379)

Embry, D.D., & Malfetti, J. *Reducing the risk of pedestrian accidents involving preschoolers through parent training and modeling: An experimental analysis in the natural environment*. (ECI Document No. 302)

Embry, L.H., Buchman, B., Isaacs, C., Martin, C., & Rogers-Warren, A. *An ecobehavioral analysis of community interaction patterns of families with handicapped children*. Paper presented at the 5th annual convention of the Association of Behavior Analysis, Dearborn, Michigan, 1979.

Embry, L.H., & Herbert-Jackson, E. *Group training for parents: The mechanics of effectiveness*. Workshop presented at the 11th annual convention of the Association for the Advancement of Behavior Therapy, Atlanta, 1977.

Embry, L.H., & Herbert-Jackson, E. *When and where does it hurt--A survey of parenting problems*. Paper presented at the 4th annual convention of the Midwestern Association of Behavior Analysis Chicago, 1978. (ECI Document No. 304)

Engelmann, S. *Preventing failure in the primary grades*. Chicago: SRA, 1969.

Etzel, B.C., & LeBlanc, J.M. The simplest tratement alternative: The law of parsimony applied to choosing appropriate instructional control and errorless-learning procedures for the difficult-to-teach child. *Journal of Autism and Developmental Disorders*, 1979, 9, 361-382. (ECI Document No. 405)

Evans, I.M., & Nelson, R.O. Assessment of child behavior problems. In A.R. Cimimero, K.S. Calhoun, & H.E. Adams (Eds.), *Handbook of behavioral assessment*. New York: Wiley & Sons, 1977.

Farber, B., & Ryckman, D.B. Effects of severely mentally retarded children in family relations. *Mental Retardation Abstracts*, 1965, *2*, 1-17.

Finneran, T.R., & Henry, J.S. Structured analysis for data base design. *Datamation*, November 1977, 99-113.

Fischer, P.L., & Torney, J.V. Influence of children's stories on dependency, a sex-typed behavior. *Developmental Psychology*, 1976, *12*, 489-490.

Flanagan, J.C. Case studies on the utilizing of behavioral science research. *Case studies in bringing behavioral science into use: Studies in the utilization of behavior science* (Vol. 1). Stanford, Calif.: Institute for Communication Research, Stanford University, 1961.

Fowler, S.A., & Baer, D.M. "Do I Have To Be Good All Day?" The timing of Delayed Reinforcement as a factor in generalization. *Journal of Applied Behavior Analysis*, 1981, *14*, 13-24. (ECI Document No. 352)

Fox, R.S., & Lippitt, R. *The innovation and sharing of teaching practice: Stimulating adoption and adaption of selected teaching practices.* Ann Arbor: Institute for Social Research, University of Michigan, 1967.

Frankenburg, W.K., & Dodds, J.B. *Denver developmental screening test.* Denver: University of Colorado Medical Center, 1969.

Fredericks, H.D.B., Baldwin, V., Grove, D., Moore, W., Riggs, C., & Lyons, B. Integrating the moderately and severely handicapped preschool child into a normal day care setting. In M.J. Guralnick (Ed.), *Early intervention and the integration of handicapped and non-handicapped children*. Baltimore: University Park Press, 1978.

Fry, J.P., & Sibley, E.H. Evolution of data-base management systems. *Computing Surveys*, 1976, *8*, 7-42.

Garcia, E. The training and generalization of a conversational speech form in nonverbal retardates. *Journal of Applied Behavior Analysis*, 1974, *7*, 137-149.

Garvey, W.D., & Griffith, B.C. Scientific communication: Its role in the conduct of research and creation of knowledge. *American Psychologist*, 1971, *26*, 349-362.

Gesell, A.L., Thompson, H., & Armatruda, C.A. *Infant behavior: Its genesis and growth*. New York: McGraw-Hill, 1934.

Gewirtz, J.L., & Stingel, K. The learning of generalized imitation as the basis for identification. *Psychological Review*, 1968, *75*, 374-397.

Gil, D.G. *Violence against children*. Cambridge, Mass.: Harvard University Press, 1970, 1973.

Glaser, E.M. Knowledge transfer and institutional change. *Professional Psychology*, 1973, *4*, 434-444.

Glaser, E.M., Coffey, J.S., Machs, J.B., & Sarason, I.B. *Utilization of applicable research and demonstration results*. Los Angeles: Human Interaction Research Institute, 1967.

Glaser, E.M., & Taylor, S. *Factors influencing the success of applied research*. Washington, D.C.: National Institute of Mental Health, Department of Health, Education and Welfare, Final Report on Contract No. 43-67-1365, January 1969.

Glaser, E.M., & Wrenn, G.G. *Putting research, experimental and demonstration findings to use*. Washington, D.C.: Office of Manpower Policy, Evaluation, and Research, U.S. Department of Labor, 1966.

Glazzard, P. Training students to work independently in the classroom. *Teaching Exceptional Children*, 1981, *13*, 66-70.

Gloch, C.Y. Applied social research: Some conditions affecting its utilization. In *Case studies in bringing behavioral science into use: Studies in the utilization of behavioral science* (Vol. 1). Stanford, Calif.: Institute for Communication Research, Stanford University, 1961.

Goetz, E.M., & Etzel, B.C. *Functional analysis of acquisition, maintenance and generalization by reading procedures*. Paper presented at the 86th annual convention of the American Psychological Association, Toronto, Ontario, Canada, 1978.

Goldin, G.J., Margolin, K.N., & Stolsky, B.A. The utilization of rehabilitation research: Concepts, principles, and research. *Northeastern Studies in Vocational Rehabilitation*, 1969, *6*.

Greeno, J.G. Paired-associate learning with massed and distributed repetitions of items. *Journal of Experimental Psychology*, 1964, *67*, 286-295.

Griffiths, H., & Graighead, W.E. Generalization in operant speech therapy for misarticulation. *Journal of Speech and Hearing Disorders*, 1972, *37*, 485-494.

Guess, D., Sailor, W., Rutherford, G., & Baer, D.M. An experimental analysis of linguistic development: The productive use of the plural morpheme. *Journal of Applied Behavior Analysis*, 1968, *1*, 297-306.

Gump, P.V. Ecological psychologists: Critics or contributors to behavior analysis. In A. Rogers-Warren & Steven F. Warren (Eds.), *Ecological perspectives in behavior analysis*. Baltimore: University Park Press, 1977.

Gump, P. Intra-setting analysis: The third-grade classroom as a specific but instructive case. In E. Willems & H. Raush (Eds.), *Naturalistic viewpoints in psychological research*. New York: Holt, Rinehart, & Winston, 1969.

Guralnick, M.J. The value of integrating handicapped and non-handicapped preschool children. *American Journal of Ortho-Psychiatry*, 1976, *42*, 236-245.

Guralnick, M.J. *Early intervention and integration of handicapped and non-handicapped children*. Baltimore: University Park Press, 1978.

Guralnick, M.J. Social interactions among preschool children. Exceptional Children, 1980, 46 (4), 248-253.

Guttman, J., Levin, J.R., & Pressley, M. Pictures, partial pictures, and young children's oral prose learning. Journal of Educational Psychology, 1977, 69, 473-480.

Hall, R.V., Lund, D., & Jackson, D. Effects of teacher attention on study behavior. Journal of Applied Behavior Analysis, 1968, 1 1-12.

Hall, R.V., & Fox, R.G. Changing-criterion designs: An alternate applied behavior analysis procedure. In B.C. Etzel, J.M. LeBlanc, & D.M. Baer (Eds.), New developments in behavioral research: Theory, method and application (in honor of Sidney Bijou). Hillsdale, N.J.: Lawrence Erlbaum Associates, Inc., 1977.

Halpert, H.P. Communications as a basic tool in promoting utilization of research findings. Community Mental Health Journal, 1966, 2, 231-236.

Hammill, D.D., & Larsen, S.C. The effectiveness of psycholinguistic training. Exceptional Children, 1974, 41, 5-15.

Hammill, D.D., & Wiederholt, J.L. Review of the Frosting Visual Perception Test and the related training program. In L. Mann & D.A. Sabatino (Eds.), The first review of special education. Philadelphia: Journal of Special Education Press, 1973.

Haring, N. Infant identification. In M. Thomas (Ed.), Hey, don't forget about me. Reston, Va.: The Council for Exceptional Children, 1976.

Hart, B.M., Reynolds, N.J., Baer, D.M., Brawley, E.R., & Harris, F.R. Effect of contingent and noncontingent social cooperative play of a preschool child. Journal of Applied Behavior Analysis, 1968, 1, 73-76.

Hart, B.M., & Risley, T.R. Incidental teaching of language in the preschool. Journal of Applied Behavior Analysis, 1975, 8, 411-420.

Hart, B.M., & Rogers-Warren, A. Milieu teaching approaches. In R.L. Schiefelbusch (Ed), Bases of language intervention (Vol. II). Baltimore: University Park Press, 1978.

Hass, S., Ruggles, T.R., & LeBlanc, J.M. Minimal vs. criterion-related detailed instructions. Paper presented at the meeting of the Society for Research in Child Development, San Francisco, March 1979.

Havelock, R.G. Knowledge utilization and dissemination: A bibliography. Ann Arbor, Mich.: Institute for Social Research, University of Michigan, 1973.

Havelock, R.G., & Mann, F.C. Research and development laboratory management knowledge utilization study. Ann Arbor, Mich.: Institute for Social Research, University of Michigan, 1968.

Helfer, R.E., & Kempe, C.H. (Eds.), Child abuse and neglect: The family and the community. Cambridge, Mass.: Ballinger Publishing, 1976.

Hickey, D., Allen, K.E., & Baer, D.M. A teacher analysis of preschool children's free-choice preferences. A poster presented at the NAEYC, San Francisco, November 1980.

Holman, J. The moral risk and high cost of ecological concern in applied behavior analysis. In A. Rogers-Warren & S.F. Warren (Eds.), Ecological perspectives in behavior analysis. Baltimore: University Park Press, 1977.

Horowitz, F.D. Receptive-language development in the first year of life: A selective review of the literature (ECI Document No. 201), 1978.

Human Interaction Research Institute. Putting knowledge to use: A distillation of literature regarding knowledge transfer and change. Los Angeles: Human interaction Research Institute, 1976.

Ipsa, J., & Matz, R.D. Integrating handicapped preschool children within a cognitively oriented program. In M.J. Guralnick (Ed.), Early intervention and the integration of handicapped and non-handicapped children. Baltimore: University Park Press, 1978.

Irwin, O.C. Infant speech: Effects of systematic reading of stories. Journal of Speech and Hearing Disorders, 1960, 3, 187-190.

Jones, O.H.M. Mother-child communication with prelinguistic Down's syndrome and normal infants. In H.R. Schaffer (Ed.), Studies in mother-infant interaction. New York: Academic Press, 1977.

Kay, K. How mothers maintain "dialogue" with two-year-olds. In D. Olson (Ed.), The social foundations of language and thought. New York: W.W. Norton and Company, 1980.

Kazdin, A.E., Assessing the clinical or applied importance of behavior change through social validation. Behavior Modification, 1977, 1, 427-452.

Kazdin, A.E., Silverman, N.A., & Sittler, J.L. The use of prompts to enhance various effects of nonverbal approval. Journal of Applied Behavior Analysis, 1975, 8, 279-286.

Keen, P.G.W., & Gerson, E.M. The politics of software design systems. Datamation, November 1977, 80-84.

Klein, H.D. The Missouri story: A chronicle of research utilization and program planning. Paper presented at the National Conference of Social Welfare, May 1968.

Koegel, R.L., Russo, D.C., & Rincover, A. Assessing and training teachers in the generalized use of behavior modification with autistic children. Journal of Applied Behavior Analysis, 1977, 10, 197-206.

Kounin, J. Discipline and group management in classrooms. New York: Holt, Rinehart and Winston, 1970.

Kramer, S., Ruggles, T.R., & LeBlanc, J.M. The effects of imposing time limits on the responses of preschool children. Paper presented at the 13th annual convention of the Association for the Advancement of Behavior Therapy, San Francisco, December 1979.

Lesgold, A.M., Levin, J.R., Shimron, J., & Guttman, J. Pictures and young children's learning from oral prose. Journal of Educational Psychology, 1975, 67, 636-642.

Levin, J.R., Bender, B.G., & Lesgold, A.M. Pictures, repetition, and young children's oral prose learning. Audio Visual Communication Review, 1976, 24, 367-380.

Likert, R., & Lippitt, R. The utilization of social science. In L. Festinger & D. Katz (Eds.), Research methods in the behavioral sciences. New York: Dryden Press, 1963.

Lippitt, R.O. Roles and processes in curriculum development and change. In R.R. Leeper (Ed.), Strategy for curriculum change. Washington, D.C.: Association for Supervision and Curriculum Development, 1965.

Lippitt, R.O., Benne, K.D., & Havelock, R.G. A comparative analysis of the research utilization process. Paper presented at a symposium of the American Educational Research Association, Research Utilization Committee, Chicago, Ill., February 1966.

Lippitt, R.O., & Fox, R. Identifying, documenting, evaluating, and showing innovative classroom practices. Washington, D.C.: Office of Education, U.S. Department of Health, Education, and Welfare, 1967.

Livingston, S.A. Psychometric techniques for criterion-referenced testing and behavioral assessment. In J.D. Cone & R.P. Hawkins (Eds.), Behavioral assessment: New directions in clinical psychology. New York: Burner/Mazel, 1977.

Lovell, K., & Dixon, E.M. The growth of the control of grammer in imitation, comprehension and production. Journal of Child Psychology and Psychiatry, 1967, 8, 31-39.

MacKeith, R. The feelings and behavior of parents of handicapped children. Developmental Medicine and Child Neurology, 1973, 15, 524-527.

Martin, J. Computer data-base organization. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1975.

McAllister, R.J., Butler, E., & Lei, Tzuen-Jen. Patterns of interaction among families of behaviorally retarded children. Journal of Marriage and Family, 1973.

McCall, R.B. Individual differences in the Pattern of Habituation at 5 and 10 months of age. Developmental Psychology, 1979, 15, 559-569.

Michaels, J.W. On the relation between human ecology and behavior social psychology. Social Forces, 1974, 52, 313-321.

Miller, R.M., & LeBlanc, J.M. Experimental analysis of the effects of detailed and minimal instructions and their effect on acquisition of preacademic skills. Paper presented at the 81st annual convention of the American Psychological Association, Montreal, Canada, August 1973.

Miller, R.M., & LeBlanc, J.M. Experimental analysis of detailed and minimal instructions and their effect of acquisition of a word recognition task. Paper presented at the 82nd annual convention of the American Psychological Association, New Orleans, August 1974.

Mira, M. Tracking the motor development of handicapped infants. Mental Retardation, 1977, 15, 32-37.

Moerk, E.L. Changes in verbal child-mother interactions with increasing language skills of the child. Journal of Psycholinguistic Research, 1974, 3, 101-116.

Moerk, E.L. Process of language teaching and training in the interactions of mother-child dyads. Child Development, 1976, 47, 1064-1078.

Moerk, E.L. Pragmatic and semantic aspects of early language development. Baltimore: University Park Press, 1977.

Naglieri, J.A. Extrapolated developmental indicies for the Bayley Scales of Infant Development. American Journal of Mental Deficiency, 1981, 85(5), 548-550.

Niehoff, A.H. The process of innovation. In A.H. Niehoff (Ed.), Handbook of social change. Chicago: Aldine, 1966.

Paine, S.C. (Ed.), Structuring classrooms for success: A direct instruction approach. Eugene: Direct Instruction Follow Through Project, 1980.

Paisley, W.J. Information needs and uses. In C.A. Caudra (Ed.), Annual review of information science and technology (Vol. 3). New York: Interscience, 1968.

Parker, E.G., & Paisley, W.J. Research for psychologist at the interface of the scientist and his information system. American Psychologists, 1966, 21, 1060-1071.

Patterson, G.R., Cobb, T.A., & Ray, R.S. A social engineering technique for retraining the families of aggressive boys. In H.E. Adams & I.P. Unikel (Eds.), Issues and trends in behavior therapy. Springfield, Ill.: Charles C. Thomas, 1973.

Paterson, R.F. Some experiments in the organization of a class of imitative behaviors. Journal of Applied Behavior Analysis, 1968, 1, 225-235.

Peterson, N.L. Early intervention for the handicapped. In E.L. Meyen (Ed.) Exceptional children and youth: An introduction (2nd edition). Denver: Love Publishing Company, in press.

Peterson, N.L., & Haralick, J.G. Integration of handicapped and non-handicapped preschoolers: An analysis of play behavior and social interaction. Education and Training of the Mentally Retarded, 1977, 12, 235-245.

Plummer, S. Program problems and a system for diagnosis. Paper presented at the annual convention of the Council for Exceptional Children, Chicago, April 1976.

Plummer, S., Baer, D., & LeBlanc, J. Functional considerations in the use of procedural timeout and an effective alternative. Journal of Applied Behavior Analysis, 1977, 10, 689-705.

Radgowski, T.A., Allen, K.E., Ruggles, T.R., & LeBlanc, J.M. Delayed presentation of feedback in preschool group foreign language training. Paper presented at the annual convention of the American Psychological Association, Toronto, Canada, 1978.

Radgowski, T, Allen, K.E., Ruggles, T.R., Schilmoeller, O.L., & LeBlanc, J.M. Training of a foreign language to preschool children using a delayed presentation of feedback. Paper presented at the annual meeting of the Midwest Association of Behavior Analysis, Chicago, Ill., May 1978.

Ramey, C.T., Mills, P.M., Campbell, F.A., & O'Brien, C. Infants' home environments: A comparison of high-risk families and families from the general population. American Journal of Mental Deficiency, 1975, 80, 40-42.

Richland, M. Traveling seminar and conference for the implementation of educational innovations. Santa Monica, Calif.: System Development Corporation, 1965.

Richmond, J.B. The family and the handicapped child. Clinical Procedures in Child Hospitals, 1976, 29, 155-164.

Rieke, J.A. Facilitating communicative interactions in the classroom. Paper presented at the Council for Exceptional Children, New York, April 1974.

Roberts, A.O., & Larsen, J.K. Effective use of mental health research information (Final Report for National Institute of Mental Health, Grant No. 1 R01 MH 15445). Palo Alto, Calif.: American Institutes for Research, January 1971.

Rogers-Warren, A. Planned change: Ecologically based interventions. In A. Rogers-Warren & S.F. Warren (Eds.), Ecological perspectives in behavior analysis. Baltimore: University Park Press, 1977.

Rondal, J.A. Maternal speech to normal and Down's syndrome children matched for mean length of utterance. In C.E. Meyers (Ed.), Monograph of the American Association on Mental Deficiency, 1978.

Rondal, J.A., & Turnure, J.E. Maternal speech to normal and Down's syndrome children matched for mean length of utterance. Paper presented at the 100th annual meeting of the American Association of Mental Deficiency, Chicago 1976.

Rosenblatt, A. The practitioner's use and evaluation of research. Social Work, 1968, 13, 53-59.

Rubin, L.J. Installing an innovation. In R.R. Goulet (Ed.), Educational change: The reality and the promise. New York: Citation Press, 1968.

Ruch, M.D., & Levin, J.R. Pictorial organization versus verbal repetition of children's prose: Evidence for processing differences. Audio Visual Communication Review, 1977, 25, 269-278.

Ruggles, T.R., & LeBlanc, J.M. Mediated transfer and observation learning in teaching discrimination to preschool children. In, Evaluating strategies for promoting efficient learning and performance. Symposium presented at the annual meeting of the American Psychological Association, Montreal, Canada, September 1981.

Russo, D.C., & Koegel, R.L. A method for integrating an autistic child into a normal public school classroom. Journal of Applied Behavior Analysis, 1977, 10, 579-590.

Sabbert, J.K., Holt, W.J., Domash, M.A., Nelson, A.L., & Etzel, B.C. Functional analysis of teaching different sizes of groups. Paper presented at the 84th annual convention of the American Psychological Association, Washington, D.C., 1976.

Sanford, A. Learning accomplishment profile. Winston-Salem, N.C.: Kaplan School Supply Corp., 1975.

Schilmoeller, K.J., & Etzel, B.C. An experimental analysis of criterion-related and non-criterion-related cues in "errorless" stimulus control procedures. In B.C. Etzel, J.M. LeBlanc, & D.M. Baer (Eds.), New developments in behavioral research: Theory, method and application (in honor of Sidney W. Bijou). Hillsdale, N.J.: Lawrence Erlbaum Associates, Inc., 1977.

Schumaker, J., & Sherman, J.A. Training generative verb usage by imitation and reinforcement procedures. Journal of Applied Behavior Analysis, 1970, 3, 273-287.

Sedlak, R.A., & Weener, P. Review of research on the Illinois Test of Psycholinguistic Abilities. In L. Mann & D.A. Sabatino (Eds.), The first review of special education. Philadelphia: Journal of Special Education Press, 1973.

Shearer, D., Billingsley, J., Frohman, A., Hilliard, J., Johnson, F., & Shearer, M. The Portage guide to early education: Instructions and checklist. Portage, Wisc.: Experimental Education Cooperative, Education Service Agency #12, 1974.

Shere, E.S., & Kastenbaum, R. Mother-child interaction in cerebral palsy: Environmental and psycho-social obstacles to cognitive development. Genetic Psychology Monographs, 1966, 73, 255-335.

Sidman, M., & Cresson, Jr., O. Reading and crossmodal transfer of stimulus equivalences in severe retardation. American Journal of Mental Deficiency, 1973, 77 (5), 515, 523.

Sidman, M., & Stoddard, L.T. Programming perception and learning for retarded children. In N.R. Ellis (Ed.), International review of research in mental retardation (Vol. 2). New York: Academic Press, 1966.

Smart, M.S., & Smart, R.C. Children: Development and relationships. New York: Macmillan, 1967.

Snyder, L., Apolloni, T., & Cooke, T.P. Integrated settings at the early childhood level: The role of non-retarded peers. Exceptional Children, 1977, 43, 262-266.

Sontag, E., Smith, J., & Sailor, W. The profoundly/severely handicapped: Who are they? Where are we? Journal of Special Education, 1977, 11, 5-11.

Steinman, W.M. Implicit instructions and social influence in "generalized imitation: and comparable nonimitative situations. Merrill Palmer Quarterly, 1976, 22, 85-92.

Stokes, T.F., Fowler, S.A., & Baer, D.M. Training preschool children to recruit natural communities of reinforcement. Journal of Applied Behavior Analysis, 1978, 11, 285-303.

Stokes, T.F., & Baer, D.M. An implicit technology of generalization. Journal of Applied Behavior Analysis, 1977, 10, 349-367.

Terrace, H.S. Discrimination learning with and without errors. Journal of the Experimental Analysis of Behavior, 1963, 6, 1-27.

Thelen, M.H., and Rennie, D.L. The effect of vicarious reinforcement on imitation: A review of the literature. In B.A. Maher (Ed.), Progress in experimental personality research (Vol. 6). New York: Academic Press, 1972, 83-108.

Tizard, J., & Grad, J.C. The mentally handicapped and their families: A social survey. London: Oxford University Press, 1961.

Todd, V.E., & Herfferman, H. The years before school. New York: Macmillan, 1964.

Touchette, P. Transfer of stimulus control: Measuring the moment of transfer. Journal of the Experimental Analysis of Behavior, 1971, 15, 347-354.

U.S. Department of Health, Education, and Welfare. Research utilization in aging: An exploration. Washington, D.C.: The Department, 1963.

Van Huton, R. Social validation: The evolution of standards of competency for target behaviors. Journal of Applied Behavior Analysis, 1979, 12, 581-591.

Vietze, P., Abernathy, S., Ashe, M., & Faulstuch, G. Contingent interaction between mothers and their developmentally delayed infants. In G.P. Sackett (Ed.), Observing behavior (Vol.1): Theory and applications in mental retardation. Baltimore: University Park Press, 1978.

Wahler, R.G. Oppositional children: A quest for parental reinforcement control. Journal of Applied Behavior Analysis, 1969, 2, 159-170.

Wahler, R.G. Some ecological problems in child modification. In S. Bijou & E. Ribes-Inesta (Eds.), Behavior modification: Issues and extensions. New York: Academic Press, 1972.

Wahler, R., The insular family: A deviance support system for oppositional behavior. Unpublished paper, University of Tennessee, 1979.

Wahler, R.G., Berland, R.M., Coe, T.D., & Leske, G. Social systems analysis: Implementing an alternative behavioral model. In A. Rogers-Warren & S.F. Warren (Eds.), Ecological perspectives in behavior analysis. Baltimore: University Park Press, 1977.

Walberg, G., & Marjoribanks, K. Differential mental abilities and home environments: A canonical analysis. Developmental Psychology, 1973, 9, 363-368.

Walker, H.M., & Hops, H. Use of normative peer data as a standard for evaluating classroom treatment effects. Journal of Applied Behavior Analysis, 1976, 9, 159-168.

Weckesser, Ernest P. *A beginner's guide to selling information by mail*. Dunkirk, N.Y.: The Green Tree Press, 1977.

Whitehurst, G.J. Comprehension, selective imitation, and the CIP hypothesis. *Journal of Experimental Child Psychology*, 1977, *23*, 23-38.

Whitehurst, G.J. Observational learning. In A.C. Catania & T.A. Brigham (Eds.), *Handbook of applied behavior analysis: Social and instructional processes*. New York: John Wiley and Sons, 1978.

Wildgen, J., & Sherman, J.A. *Once upon a time....on how to teach retarded children to tell stories--toward conversational speech*. The University of Kansas, Lawrence, Kansas, 1976.

Wilson, M., Allen, K.A., Ruggles, T.R., & LeBlanc, J.M. A comparison of group and individual training of preschool children on a word recognition task. Department of Human Development, University of Kansas. Research in progress, 1978.

Wolfensberger, W. Embarrassments in the diagnostic process. *Mental Retardation*, 1965, *3*, 29-31.

Wynne, S., Ulfelder, L.S., & Dakof, G. *Mainstreaming and early childhood education for handicapped children: Review and implications of research*. Washington, D.C.: U.S. Department of Health, Education, and Welfare, U.S. Office of Education, Bureau of Education for the Handicapped, Division of Innovation and Development, 1975.

Ysseldyke, J.E. Diagnostic-prescriptive teaching: The search for aptitude-treatment interaction. In L. Mann & D.A. Sabatino (Eds.), *The first review of special education*. Philadelphia: Journal of Special Education Press, 1973.

Zander, A. Resistance to change: Its analysis and prevention. In W.G. Bennis, K.D. Benne, & R. Chin (Eds.), *The planning of change: Readings in the applied behavioral sciences*. New York: Holt, Rinehart & Winston, 1962.

Zebrowitz-McArthur, L., & Eisen, S.V. Achievements of male and female storybook characters as determinants of achievement behavior by boys and girls. *Journal of Personality and Social Psychology*, 1976, *33* 467, 473.